# Table of Contents

UND 2019-2020 Academic Catalog ........................................ 11
Notices .................................................................................. 12
Undergraduate Academic Information ................................... 14
   New Undergraduate Student Information ............................... 14
   Admission of Freshman (Non-Degree and Early Entry) ........... 14
   Admission of Transfer Students ......................................... 16
   Orientation Programs for New Students ................................. 17
   Readmission of Former Undergraduate Students ................... 17
Undergraduate Academic Information ................................... 17
   Degrees Granted ............................................................ 18
   The Purposes of a University Education ............................... 18
   The North Dakota University System Transfer Agreement ....... 18
   University Graduation Requirements .................................. 18
Major Declaration Policy, Common Course Numbers, Special Exams ................................................................................. 19
   Cooperative Education ..................................................... 20
   Registration ....................................................................... 20
   The Grading System ......................................................... 21
   Transcripts of Academic Records ....................................... 23
   Students in Debt to the University ..................................... 23
   University Attendance Policy and Procedure ....................... 23
   Final Examination Policy .................................................. 23
   Undergraduate Probation, Suspension and Dismissal Policy .... 23
   Conduct in General .......................................................... 24
   Scholastic Honesty .......................................................... 24
   Academic Honors ............................................................ 24
Undergraduate Programs and Courses ................................. 26
   Accountancy (Acct) ......................................................... 26
   Bachelor of Accountancy .................................................. 27
   Bachelor of Business Administration with Major in Information Systems ................................................................. 28
   Bachelor of Business Administration with Major in Managerial Finance and Accounting ................................................. 28
   Minor in Information Systems ............................................ 28
Aerospace Studies (AS) ........................................................... 29
   Aerospace Studies .......................................................... 29
American Indian Studies (IS) .................................................. 30
   Bachelor of Arts in American Indian Studies ....................... 31
   Minor in American Indian Studies ...................................... 32
Anatomy and Cell Biology (Anat) ............................................ 32
   Anthropology (Anth) ....................................................... 32
   Bachelor of Arts in Anthropology ....................................... 33
   Minor in Anthropology .................................................... 34
Art and Design (Art) ............................................................. 34
   B.A. with Major in Visual Arts .......................................... 35
   B.F.A. with a Major in Graphic Design ............................... 36
   B.F.A. with a Major in Visual Arts ....................................... 36
Bachelor of Arts with Major in Visual Arts ............................ 37
Bachelor of Fine Arts with Major in Graphic Design ................ 37
Bachelor of Fine Arts with Major in Visual Arts ..................... 37
Minor in Art History and Museum Studies ............................. 38
Minor in Graphic Design ..................................................... 38
Minor in Visual Arts (Studio) ................................................. 38
Arts and Sciences (A & S) .................................................... 38
   Certificate in Diversity and Inclusion .................................. 39
   Minor in Canadian Area Studies ....................................... 40
Athletic Training ................................................................. 40
Atmospheric Sciences (AtSc) ................................................. 40
   Bachelor of Science in Atmospheric Sciences ..................... 41
   Minor in Atmospheric Sciences ....................................... 42
Aviation (Avit) ................................................................. 42
   Bachelor of Science in Aeronautics with a Major in Air Traffic Management ............................................................. 47
   Bachelor of Science in Aeronautics with a Major in Aviation Studies ................................................................. 48
   Bachelor of Science in Aeronautics with a Major in Commercial Aviation ............................................................. 48
   Bachelor of Science in Aeronautics with a Major in Flight Education ................................................................. 49
   Bachelor of Science in Aeronautics with a Major in Unmanned Aircraft Systems Operations .................................... 49
   Minor in Aviation Management ......................................... 50
   Minor in Professional Flight .............................................. 50
   Minor in Unmanned Aircraft Systems ................................. 50
   Safety Specialization ....................................................... 50
   Specialization in Business Aviation .................................... 50
Banking and Financial Economics ........................................ 50
Biotechnology (BT) ............................................................. 51
   Biochemistry and Molecular Biology (BMB) ....................... 51
   Biology (Biol) ............................................................... 51
   Bachelor of Science with Major in Biology ......................... 53
   Bachelor of Science with Major in Biology (Professional Health Specialization) ......................................................... 55
   Bachelor of Science with Major in Fisheries and Wildlife Biology ................................................................. 57
   Bachelor of Science with Major in Molecular and Integrative Biology ................................................................. 57
   Minor in Biology ............................................................ 59
Biomedical Science (BMD) ................................................... 59
   Business Administration (BAdm) ...................................... 59
   Minor in Chinese Studies: Culture and Business ................... 60
   Minor in International Business for Business Majors only ........ 60
   Minor in Sport Business .................................................. 60
Chemical Engineering (ChE) ............................................... 61
   Bachelor of Science in Chemical Engineering ..................... 62
Chemistry (Chem) ............................................................. 64
   Bachelor of Science in Chemistry (ACS Certified) ............... 66
   Bachelor of Science with Major in Chemistry ..................... 66
| Minor in Chemistry | 68 |
| Civil Engineering (CE) | 68 |
| Bachelor of Science in Civil Engineering | 69 |
| Communication Program (Comm) | 70 |
| Bachelor of Arts with Major in Communication | 71 |
| Minor in Communication | 72 |
| Specialization in International/Intercultural Communication | 72 |
| Communication Sciences and Disorders (CSD) | 72 |
| Bachelor of Arts with Major in Communication Sciences and Disorders | 73 |
| School of Electrical Engineering and Computer Science (EECS) | 74 |
| Bachelor of Arts with Major in Computer Science | 77 |
| Bachelor of Science in Data Science | 77 |
| Bachelor of Science with a Major in Computer Science | 78 |
| Minor in Computer Science | 78 |
| Minor in Cyber Security | 78 |
| Optional Specializations | 78 |
| Counseling Psychology and Community Services (Coun) | 79 |
| Combined Program in Counseling with a Rehabilitation Emphasis | 79 |
| Criminal Justice Studies (CJ) | 80 |
| Bachelor of Science in Criminal Justice Studies | 81 |
| Minor in Criminal Justice Studies | 81 |
| Earth System Science and Policy (ESSP) | 81 |
| Minor in Sustainability Studies | 82 |
| Economics (Econ) | 82 |
| Bachelor of Economics | 84 |
| Bachelor of Business Administration with Major in Banking and Financial Economics | 85 |
| Bachelor of Business Administration with Major in Business Economics | 85 |
| Certificate in Applied Economics | 86 |
| Minor in Economics | 86 |
| Education and Human Development (EHD) | 87 |
| Educational Leadership (EDL) | 87 |
| School of Electrical Engineering and Computer Science (EECS) | 87 |
| Bachelor of Science in Cyber Security | 91 |
| Bachelor of Science in Electrical Engineering | 91 |
| Bachelor of Science in Electrical Engineering with Aerospace Focus | 92 |
| Bachelor of Science in Electrical Engineering with Biomedical Engineering Focus | 93 |
| Bachelor of Science in Electrical Engineering with Computer Science Focus | 95 |
| Minor in Aviation - Professional Flight | 95 |
| Minor in Biomedical Engineering | 96 |
| Minor in Electrical Engineering | 96 |
| Engineering (Engr) | 96 |
| Minor in Engineering Science | 97 |
| English Language and Literature (Engl) | 97 |
| Bachelor of Arts with Major in English | 98 |
| Certificate in Writing and Editing | 99 |
| Minor in English | 100 |
| Entrepreneurship (ENTR), School of | 100 |
| Bachelor of Business Administration with Major in Entrepreneurship | 103 |
| Bachelor of Science in Industrial Technology | 104 |
| Minor in Graphic Design Technology | 104 |
| Environmental Studies (Geog) | 109 |
| Finance (Fin) | 104 |
| Bachelor of Business Administration with Major in Investments | 105 |
| Bachelor of Business Administration with Major in Managerial Finance and Accounting | 106 |
| Fine Arts (FA) | 106 |
| Forensic Science | 106 |
| Bachelor of Science with Major in Forensic Science | 108 |
| General Studies | 109 |
| Bachelor of General Studies with a Major in General Studies | 109 |
| Geography and Geographic Information Science (Geog) | 109 |
| Bachelor of Arts with Major in Environmental Studies | 111 |
| Bachelor of Science with Major in Environmental Studies | 112 |
| Bachelor of Science with a Major Geography | 112 |
| Minor in Geography | 113 |
| Minor in Geospatial Technologies | 113 |
| Harold Hamm School of Geology and Geological Engineering (Geol and GeoE) | 114 |
| Bachelor of Science in Earth Science | 118 |
| Bachelor of Science in Environmental Geoscience | 118 |
| Bachelor of Science in Geological Engineering | 119 |
| Bachelor of Science in Geology | 120 |
| Minor in Geology | 121 |
| History (Hist) | 121 |
| Bachelor of Arts with Major in History | 124 |
| Minor in History | 124 |
| Histotechnician Program | 124 |
| Histotechnician Certificate | 125 |
| Honors Program (Hon) | 125 |
| Honors | 126 |
| Humanities (Hum) | 126 |
| Interdisciplinary Health Studies (IDS) | 127 |
| International Studies (A&IS) | 127 |
| Bachelor of Arts with Major in International Studies | 127 |
| Minor in International Studies | 128 |
| Kinesiology and Public Health Education (KPHE) | 128 |
| Bachelor of Science in Kinesiology | 133 |
| Bachelor of Science in Public Health Education (B.S.P.H.E.) | 135 |
| Minor in Athletic Coaching | 135 |
| Minor in Public Health | 135 |
Languages: Department of Modern and Classical Languages & Literatures (Lang) ................................................ 136
  Bachelor of Arts with a Major in Chinese Studies ........................................... 140
  Bachelor of Arts with a Major in Classical Studies ........................................ 140
  Bachelor of Arts with a Major in French ....................................................... 141
  Bachelor of Arts with a Major in German Studies ........................................... 142
  Bachelor of Arts with a Major in Languages .................................................. 142
  Bachelor of Arts with a Major in Languages/Teacher Certification ................ 142
  Bachelor of Arts with a Major in Norwegian .................................................. 143
  Bachelor of Arts with a Major in Spanish ..................................................... 143
  Certificate in Chinese ..................................................................................... 143
  Certificate in Classical Studies ......................................................................... 143
  Certificate in French ......................................................................................... 143
  Certificate in German ........................................................................................ 143
  Certificate in Norwegian ................................................................................... 144
  Certificate in Spanish ......................................................................................... 144
  Minor in Chinese Studies: Language and Culture ............................................ 144
  Minor in Classical Studies .................................................................................. 144
  Minor in French .................................................................................................. 144
  Minor in German ................................................................................................. 145
  Minor in Norwegian ........................................................................................... 145
  Minor in Spanish ................................................................................................. 145
  Leadership Minor (Lead) .................................................................................... 145
  Leadership Minor ............................................................................................... 145
  Linguistics (Ling) .............................................................................................. 146
  Minor in Linguistics ............................................................................................ 146
  Management (Mgmt) ......................................................................................... 147
  Bachelor of Administration with Major in Airport Management ................... 148
  Bachelor of Business Administration with Major in Aviation Management ........ 149
  Bachelor of Business Administration with Major in Operations and Supply Chain Management ......................................................... 149
  Bachelor of Business Administration with a Major in Human Resource Management ................................................................. 150
  Bachelor of Business Administration with a Major in Management .......... 150
  Minority in Operations and Supply Chain Management ................................... 151
  Marketing (MKT) ............................................................................................... 151
  Bachelor of Business Administration with Major in Marketing .................... 152
  Mathematics (Math) ........................................................................................... 153
  Bachelor of Science with Major in Mathematics ............................................... 155
  Minor in Mathematics ....................................................................................... 155
  Minor in Mathematics for Elementary Education ............................................. 156
  Minor in Statistics .............................................................................................. 156
  Mechanical Engineering (ME) .......................................................................... 156
  Bachelor of Science in Mechanical Engineering ............................................. 158
  Medical Laboratory Science (MLS) ................................................................. 159
  Bachelor of Science in Medical Laboratory Science .................................... 161
  Certificate in Medical Laboratory Science Program (4+1 Track) ............. 162
  Medicine (Med) ................................................................................................. 163
  Microbiology and Immunology (MBio) ............................................................. 163
  Military Science (MS) ....................................................................................... 163
  Minor in Military Science .................................................................................. 164
  Music (Mus) ....................................................................................................... 165
  Bachelor of Arts with a Major in Music ............................................................ 168
  Bachelor of Music with Major in Music Education ......................................... 169
  Bachelor of Music with Major in Performance ............................................... 170
  Minor in Music ................................................................................................... 170
  Minor in Music ................................................................................................... 171
  Nonprofit Leadership Program (NLP) .............................................................. 171
  Certificate in Nonprofit Leadership ................................................................... 171
  Minor in Nonprofit Leadership ......................................................................... 171
  Nursing (Nurs) .................................................................................................... 172
  Bachelor of Science in Nursing On-Campus Program ................................... 174
  Bachelor of Science in Nursing Online Program ............................................ 176
  Nutrition and Dietetics (N&D) ........................................................................ 177
  Bachelor of Science in Human Nutrition ......................................................... 178
  Bachelor of Science in Dietetics ......................................................................... 179
  Minor in Nutrition ............................................................................................. 179
  Occupational Therapy (OT) .............................................................................. 180
  Peace Studies (PS) ............................................................................................. 180
  Petroleum Engineering (PtE) ............................................................................ 180
  Bachelor of Science in Petroleum Engineering .............................................. 182
  Certificate in Petroleum Engineering ............................................................... 182
  Pharmacology, Physiology and Therapeutics (PPT) ...................................... 183
  Philosophy and Religious Studies (Phil) ......................................................... 183
  Bachelor of Arts with Major in Philosophy and Religious Studies: Philosophy Concentration ................................................................. 185
  Bachelor of Arts with Major in Philosophy and Religious Studies: Pre-Law Concentration .............................................................. 185
  Bachelor of Arts with Major in Philosophy and Religion: Religious Studies Concentration ................................................................. 186
  Minor in Ethics .................................................................................................. 186
  Minor in Philosophy and Religious Studies: Philosophy Concentration .......... 186
  Minor in Philosophy and Religious Studies: Religious Studies Concentration .......................... 186
  Physical Therapy (PT) ..................................................................................... 187
  Physics and Astrophysics (Phys) ...................................................................... 187
  Bachelor of Science with Major in Physics ..................................................... 189
  Five-Year Bachelor of Science-Master of Science Degree Program in Physics ........................................................................ 189
  Minor in Astrophysics ........................................................................................ 190
  Minor in Physics ................................................................................................ 190
  Political Science (Pols) .................................................................................... 190
  Bachelor of Arts in Political Science ................................................................ 192
  Minor in Political Science .................................................................................. 192
  Psychology (Psyc) ............................................................................................. 192
  Bachelor of Arts/Bachelor of Science with Major in Psychology ............... 194
| Certificate in Behavioral Health                     | 195 |
| Certificate in Cyberpsychology                      | 195 |
| Certificate in Forensic Psychology                  | 195 |
| Minor in Psychology                                 | 195 |
| Public Affairs                                      | 196 |
| Bachelor of Science with Major in Public Affairs    | 196 |
| Minor in Public Administration                      | 197 |
| Rehabilitation and Human Services (RHS)             | 197 |
| Bachelor of Science in Rehabilitation and Human Services | 197 |
| Minor in Rehabilitation and Human Services          | 198 |
| Social Science                                      | 198 |
| Bachelor of Arts with Major in Social Science       | 198 |
| Social Work (SWk)                                   | 198 |
| Bachelor of Science in Social Work                  | 199 |
| Bachelor of Science in Social Work Second Degree Program | 200 |
| Minor in Chemical Dependency                        | 200 |
| Minor in Gerontology                                | 200 |
| Sociology (Soc)                                     | 201 |
| Bachelor of Arts with Major in Sociology            | 202 |
| Minor in Sociology                                  | 202 |
| Space Studies (SpSt)                                | 202 |
| Minor in Space Studies                              | 203 |
| Minor in Space Studies                              | 204 |
| Sports Medicine                                     | 205 |
| Bachelor of Science in Athletic Training            | 205 |
| Teaching and Learning (T&L)                         | 206 |
| Bachelor of Science in Education in Secondary Education | 209 |
| Bachelor of Science in Education with Composite Major in Social Studies | 209 |
| Bachelor of Science in Education with Double Major in Elementary Education and Early Childhood | 210 |
| Bachelor of Science in Education with Double Major in Elementary and Middle Level Education | 210 |
| Bachelor of Science in Education with Major in Early Childhood Education | 211 |
| Bachelor of Science in Education with Major in Elementary Education | 211 |
| Bachelor of Science in Education with Major in Middle Level Education | 212 |
| Bachelor of Science in Education with Major in Science | 212 |
| English Language Learner or Bilingual Education Endorsement | 213 |
| Kindergarten Endorsement                            | 213 |
| Minor in Early Childhood Education                   | 213 |
| Minor in Literacy Education                         | 213 |
| Minor in Middle Level Education                     | 214 |
| Minor in Special Education                           | 214 |
| Secondary Education Licensure                        | 214 |
| Theatre Arts (Thea)                                 | 214 |
| Bachelor of Arts with Major in Theatre Arts         | 216 |
| Bachelor of Fine Arts in Musical Theatre with Major in Theatre Arts | 216 |
| Minor in Dance                                      | 217 |
| Minor in Theatre Arts                               | 217 |
| University Courses (UNIV)                           | 217 |
| Women and Gender Studies (WGS)                      | 218 |
| Bachelor of General Studies: Women and Gender Studies | 218 |
| Minor in Women & Gender Studies                     | 219 |
| Four Year Plans                                     | 220 |
| College of Arts and Sciences                        | 220 |
| American Indian Studies                             | 220 |
| Anthropology                                        | 222 |
| Biology                                             | 222 |
| Chemistry                                           | 227 |
| Communication                                       | 229 |
| Communication Sciences and Disorders                | 229 |
| Computer Science                                    | 230 |
| Criminal Justice Studies                            | 230 |
| Economics                                           | 231 |
| English                                             | 232 |
| Environmental Studies                               | 233 |
| Forensic Science                                    | 234 |
| Geography                                           | 235 |
| Graphic Design and New Art Media                    | 238 |
| History                                              | 238 |
| Honors                                               | 239 |
| Instrumental Performance                            | 240 |
| International Studies                               | 242 |
| Languages                                           | 243 |
| Mathematics                                         | 246 |
| Music                                               | 248 |
| Music Education                                     | 252 |
| Musical Theatre                                     | 255 |
| Philosophy and Religion                             | 256 |
| Physics                                             | 258 |
| Psychology                                          | 259 |
| Sociology                                           | 260 |
| Theatre Arts                                        | 261 |
| Visual Arts                                         | 261 |
| Visual Arts                                         | 266 |
| Vocal Performance                                   | 267 |
| College of Business and Public Administration        | 269 |
| Accountancy                                         | 269 |
| Airport Management                                  | 270 |
| Aviation Management                                 | 271 |
| Banking & Financial Economics                       | 271 |
| Business Economics                                  | 272 |
| Economics                                           | 272 |
Graduate Minor in Statistics ........................................ 473
Master of Education in Mathematics ............................. 473
Master of Science with Major in Mathematics ................ 473
Medical Laboratory Science ........................................ 474
Master of Science in Medical Laboratory Science ............ 475
Music ........................................................................ 475
Doctor of Philosophy in Music Education ........................ 477
Master of Music .......................................................... 478
Nursing ...................................................................... 480
Nurse Anesthesia ......................................................... 485
Master of Science in Nurse Anesthesia ......................... 491
Nurse Educator ............................................................ 491
Master of Science in Nurse Educator ............................ 491
Psychiatric Mental Health Nurse Practitioner ................. 492
Master of Science in Psychiatric Mental Health Nurse Practitioner 497
Post-Master's Certificate in Nursing ............................... 498
Post Master's Certificate in Nurse Education ................ 498
Family Nurse Practitioner .......................................... 498
Master of Science in Family Nurse Practitioner ............ 503
Adult Gerontology Primary Care Nurse Practitioner ....... 503
Master of Science in Adult Gerontology Primary Care Nurse Practitioner 509
Nutrition and Dietetics ............................................... 509
Master of Science in Nutrition ..................................... 510
Occupational Therapy ................................................. 511
Doctor of Occupational Therapy ................................ 513
Master of Occupational Therapy ................................ 515
Physical Therapy ....................................................... 518
Doctor of Physical Therapy ....................................... 520
Physician Assistant Studies ....................................... 521
Master of Physician Assistant Studies ......................... 523
Physics and Astrophysics ........................................... 524
5-year B.S.-M.S. Degree Program in Physics ................ 525
Doctor of Philosophy in Physics and Astrophysics .......... 526
Master of Science in Physics and Astrophysics ............. 526
Psychology ................................................................. 527
Doctor of Philosophy in Clinical Psychology ................. 528
Doctor of Philosophy in General/Experimental Psychology 529
Graduate Certificate in Behavioral Data Analytics ........ .. 529
Graduate Certificate in Cyber Security and Behavior ....... 529
Graduate Minor in Psychology ................................... 529
Master of Arts in Forensic Psychology ......................... 530
Master of Arts in Psychology ..................................... 530
Master of Science in Forensic Psychology .................... 531
Public Affairs ............................................................. 531
B.S.P.A./M.P.A. Combined Degree ............................... 533
Certificate in Health Administration ............................ 534
Certificate in Policy Analysis .................................................. 534
Certificate in Public Administration ...................................... 534
Certificate in Social Entrepreneurship .................................... 535
Combined Master of Public Administration/Juris Doctor Degree ... 535
Master of Public Administration .............................................. 535
Public Health ......................................................................... 536
Graduate Certificate in Public Health ...................................... 539
Master of Public Health ......................................................... 539
Social Work ........................................................................... 541
Master of Social Work ......................................................... 542
Master of Arts in Sociology .................................................... 543
Space Studies ......................................................................... 545
Cognate/Minor in Space Studies ............................................ 549
Master of Science in Space Studies ........................................ 549
Theatre Arts ........................................................................... 550
University Courses ............................................................... 550

Departmental Courses, Programs ........................................... 323
Accountancy .......................................................................... 324
Master of Accountancy ......................................................... 326
Aerospace Sciences ............................................................... 327
Art and Design Visual Arts ..................................................... 329
Master of Fine Arts ............................................................... 329
Arts and Sciences ................................................................. 330
Atmospheric Sciences .......................................................... 330
Doctor of Philosophy in Atmospheric Sciences ....................... 332
Master of Science in Atmospheric Sciences .......................... 332
Aviation .................................................................................. 333
Master of Science in Aviation ............................................... 337
Biology ................................................................................... 339
Doctor of Philosophy in Biology ............................................. 342
Master of Science in Biology ................................................ 342
Biomedical Sciences ............................................................ 343
Doctor of Philosophy in Biomedical Sciences ........................ 346
Master of Science in Biomedical Sciences ............................. 347
Business Administration ...................................................... 348
Master of Business Administration ...................................... 354
Master of Business Administration/Juris Doctor Combined Program .................................................. 355
Chemistry .............................................................................. 356
Bachelor of Science/Master of Science Combined Degree in Chemistry .................................................. 357
Doctor of Philosophy in Chemistry ....................................... 358
Master of Science in Chemistry ............................................. 358
Clinical Translational Science ................................................. 359
Doctor of Philosophy in Clinical Translational Science .......... 359
Master of Science in Clinical Translational Science ............... 360
Communication ...................................................................... 361
Doctor of Philosophy in Communication ............................... 362
Master of Arts in Communication ......................................... 363
Communication Sciences and Disorders ............................. 364
Master of Science in Communication Sciences and Disorders ...... 365
Computer Science ................................................................. 365
Doctor of Philosophy in Scientific Computing ......................... 367
Master of Science in Computer Science ................................ 369
Master of Science in Data Science ....................................... 370
Counseling Psychology and Community Services ................ 370
Bachelor of Science in Rehabilitation and Human Services/Master of Arts in Counseling .................. 373
Doctor of Philosophy in Counseling Psychology .................... 373
Master of Arts in Counseling Psychology and Community Services .................................................. 375
Minor in Counseling Psychology and Community Services ... 377
Criminal Justice ................................................................. 377
Doctor of Philosophy in Criminal Justice Studies .................. 378
Earth System Science and Policy ......................................... 378
Doctor of Philosophy in Earth System Science and Policy ....... 380
Master of Environmental Management ............................... 380
Master of Science in Earth System Science and Policy ......... 381
Economics (Applied) ............................................................ 382
Master of Science in Applied Economics ............................. 383
Education .............................................................................. 384
Educational Foundations and Research ............................... 384
Certificate in Learning Analytics .......................................... 386
Certificate in Quantitative Research Methods ....................... 386
Doctor of Philosophy in Educational Foundations and Research .............................................. 386
Master of Science in Educational Studies ............................ 387
Educational Leadership ....................................................... 388
Doctor of Education in Educational Leadership ................. 389
Doctor of Philosophy in Educational Leadership .................. 390
Master of Education in Educational Leadership ..................... 391
Master of Science in Educational Leadership ....................... 392
Specialist Diploma in Educational Leadership ....................... 392
Teaching and Learning ......................................................... 392
Doctor of Education in Educational Practice and Leadership .... 395
Doctor of Philosophy in Teaching and Learning ..................... 397
Curriculum and Instruction .................................................. 397
Master of Science in Curriculum and Instruction .................. 400
Early Childhood Education .................................................. 401
Master of Science in Early Childhood Education ................. 404
Elementary Education ......................................................... 405
Master of Education in Elementary Education ..................... 408
Master of Science in Elementary Education ....................... 408
English Language Learners (TESOL) ..................................... 409
Master of Education in ELL Education ................................. 412
Higher Education .......................................................... 412
Doctor of Education in Higher Education ....................... 414
Doctor of Philosophy in Higher Education ...................... 414
Master of Science in Higher Education .......................... 415
Instructional Design and Technology ................................. 416
Instructional Design and Technology Graduate Certificates . 417
Master of Education in Instructional Design and Technology .................................................. 417
Master of Science in Instructional Design and Technology .................................................. 418
Reading Education .......................................................... 419
Master of Education in Reading Education ...................... 422
Master of Science in Reading Education .......................... 422
Special Education .......................................................... 423
Master of Education in Special Education ....................... 426
Master of Science in Special Education .......................... 429
Engineering ................................................................. 432
Biomedical Engineering .................................................. 433
Doctor of Philosophy in Biomedical Engineering ............... 433
Master of Science in Biomedical Engineering .................. 434
Chemical Engineering ..................................................... 435
Doctor of Philosophy in Chemical Engineering ................. 436
Master of Engineering in Chemical Engineering .............. 436
Master of Science in Chemical Engineering .................... 437
Civil Engineering .......................................................... 437
Combined Degree in Civil Engineering ............................ 438
Doctor of Philosophy in Civil Engineering ....................... 438
Master of Engineering in Civil Engineering ..................... 440
Master of Science in Civil Engineering ........................... 440
Electrical Engineering and Computer Science, School of .. 441
Combined B.S./M.S. or B.S./M.Eng. Degrees in Electrical Engineering .................................................. 446
Doctor of Philosophy in Electrical Engineering ................. 446
Master of Engineering in Electrical Engineering ............... 447
Master of Science in Cyber Security ................................. 447
Master of Science in Electrical Engineering .................... 449
Energy Systems Engineering ............................................. 449
Doctor of Philosophy in Energy Engineering .................... 449
Master of Engineering in Energy Systems Engineering ....... 450
Master of Science in Energy Systems Engineering ............ 450
Environmental Engineering ............................................. 450
Certificate in Environmental Engineering ....................... 450
Doctor of Philosophy in Environmental Engineering .......... 451
Master of Engineering in Environmental Engineering ....... 451
Master of Science in Environmental Engineering ............. 451
Mechanical Engineering .................................................. 452
Doctor of Philosophy in Mechanical Engineering ............... 453
Graduate Certificate in Unmanned Aircraft Systems Engineering .................................................. 454
Master of Engineering in Mechanical Engineering ............ 455
Master of Engineering in Unmanned Aircraft Systems Engineering .................................................. 455
Master of Science in Mechanical Engineering .................. 455
Master of Science in Unmanned Aircraft Systems Engineering .................................................. 456
Petroleum Engineering .................................................... 456
Under Construction ......................................................... 456
English Language and Literature ..................................... 456
Doctor of Philosophy in English ................................. 457
Master of Arts in English ............................................. 458
Geography and Geographic Information Science ............... 458
Master of Arts in Geography ........................................ 460
Master of Science in Geography ................................. 460
Geology and Geological Engineering ................................. 461
Doctor of Philosophy in Geology ................................. 462
Master of Arts in Geology ............................................. 463
Master of Science in Geology ........................................ 463
History ........................................................................ 464
Doctor of Arts in History ............................................... 465
Doctor of Philosophy in History Combined Program with NDSU .................................................. 466
Master of Arts in History ............................................... 467
Kinesiology and Public Health Education ......................... 467
Master of Science in Kinesiology ..................................... 468
Linguistics ..................................................................... 469
Graduate Certificate in Community-Based Literacy as Applied Linguistics ........................................ 470
Master of Arts in Linguistics ........................................ 471
Mathematics .................................................................. 471
Graduate Minor in Statistics ........................................... 473
Master of Education in Mathematics ............................... 473
Master of Science with Major in Mathematics ................. 473
Medical Laboratory Science ............................................ 474
Master of Science in Medical Laboratory Science ............. 475
Music ........................................................................ 475
Doctor of Philosophy in Music Education ........................ 477
Master of Music ............................................................ 478
Nursing ........................................................................ 480
Nurse Anesthesia .......................................................... 485
Master of Science in Nurse Anesthesia ............................ 491
Nurse Educator ............................................................ 491
Master of Science in Nurse Educator .............................. 491
Psychiatric Mental Health Nurse Practitioner ................. 492
Master of Science in Psychiatric Mental Health Nurse Practitioner .................................................. 497
Post-Master's Certificate in Nursing ............................... 498
Post Master's Certificate in Nurse Education .................... 498
Family Nurse Practitioner .............................................. 498
Master of Science in Family Nurse Practitioner ............... 503
Adult Gerontology Primary Care Nurse Practitioner .......... 503
<table>
<thead>
<tr>
<th>Program</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master of Science in Adult Gerontology Primary Care Nurse Practitioner</td>
<td>509</td>
</tr>
<tr>
<td>Nutrition and Dietetics</td>
<td>509</td>
</tr>
<tr>
<td>Master of Science in Nutrition</td>
<td>510</td>
</tr>
<tr>
<td>Occupational Therapy</td>
<td>511</td>
</tr>
<tr>
<td>Doctor of Occupational Therapy</td>
<td>513</td>
</tr>
<tr>
<td>Master of Occupational Therapy</td>
<td>515</td>
</tr>
<tr>
<td>Physical Therapy</td>
<td>518</td>
</tr>
<tr>
<td>Doctor of Physical Therapy</td>
<td>520</td>
</tr>
<tr>
<td>Physician Assistant Studies</td>
<td>521</td>
</tr>
<tr>
<td>Master of Physician Assistant Studies</td>
<td>523</td>
</tr>
<tr>
<td>Physics and Astrophysics</td>
<td>524</td>
</tr>
<tr>
<td>5-year B.S.-M.S. Degree Program in Physics</td>
<td>525</td>
</tr>
<tr>
<td>Doctor of Philosophy in Physics and Astrophysics</td>
<td>526</td>
</tr>
<tr>
<td>Master of Science in Physics and Astrophysics</td>
<td>526</td>
</tr>
<tr>
<td>Psychology</td>
<td>527</td>
</tr>
<tr>
<td>Doctor of Philosophy in Clinical Psychology</td>
<td>528</td>
</tr>
<tr>
<td>Doctor of Philosophy in General/Experimental Psychology</td>
<td>529</td>
</tr>
<tr>
<td>Graduate Certificate in Behavioral Data Analytics</td>
<td>529</td>
</tr>
<tr>
<td>Graduate Certificate in Cyber Security and Behavior</td>
<td>529</td>
</tr>
<tr>
<td>Graduate Minor in Psychology</td>
<td>529</td>
</tr>
<tr>
<td>Master of Arts in Forensic Psychology</td>
<td>530</td>
</tr>
<tr>
<td>Master of Arts in Psychology</td>
<td>530</td>
</tr>
<tr>
<td>Master of Science in Forensic Psychology</td>
<td>531</td>
</tr>
<tr>
<td>Public Affairs</td>
<td>531</td>
</tr>
<tr>
<td>B.S.P.A./M.P.A. Combined Degree</td>
<td>533</td>
</tr>
<tr>
<td>Certificate in Health Administration</td>
<td>534</td>
</tr>
<tr>
<td>Certificate in Policy Analysis</td>
<td>534</td>
</tr>
<tr>
<td>Certificate in Public Administration</td>
<td>534</td>
</tr>
<tr>
<td>Certificate in Social Entrepreneurship</td>
<td>535</td>
</tr>
<tr>
<td>Combined Master of Public Administration/Juris Doctor</td>
<td>535</td>
</tr>
<tr>
<td>Master of Public Administration</td>
<td>535</td>
</tr>
<tr>
<td>Public Health</td>
<td>536</td>
</tr>
<tr>
<td>Graduate Certificate in Public Health</td>
<td>539</td>
</tr>
<tr>
<td>Master of Public Health</td>
<td>539</td>
</tr>
<tr>
<td>Social Work</td>
<td>541</td>
</tr>
<tr>
<td>Master of Social Work</td>
<td>542</td>
</tr>
<tr>
<td>Master of Arts in Sociology</td>
<td>543</td>
</tr>
<tr>
<td>Master of Arts in Sociology</td>
<td>544</td>
</tr>
<tr>
<td>Space Studies</td>
<td>545</td>
</tr>
<tr>
<td>Cognate/Minor in Space Studies</td>
<td>549</td>
</tr>
<tr>
<td>Master of Science in Space Studies</td>
<td>549</td>
</tr>
<tr>
<td>Theatre Arts</td>
<td>550</td>
</tr>
<tr>
<td>University Courses</td>
<td>550</td>
</tr>
<tr>
<td>Index</td>
<td>778</td>
</tr>
</tbody>
</table>
Satisfactory Progress

Any time you drop a course or withdraw from the University, you may be jeopardizing your federally funded student financial aid, now or in the future. You must successfully complete at least two-thirds of all the courses in which you enroll. Dropping after the first day of class may not affect your academic standing, but it may affect your ability to receive financial aid. Please review this policy and others pertaining to your financial aid in the Code of Student Life in the appendix section titled “A Summary of the Standards of Satisfactory Progress for Financial Aid Eligibility,” or contact the Student Financial Aid Office.

Notice of Nondiscrimination

The University of North Dakota (UND) is committed to the principle of equal opportunity in education and employment. UND does not discriminate on the basis of race, color, national origin, religion, sex, age, disability, sexual orientation, gender identity, genetic information, creed, marital status, veteran’s status, political belief or affiliation or any other status protected by law. Equal opportunity and access to facilities shall be available to all. This policy is applicable in employment, admissions and University-sponsored or approved programs and activities.

Pursuant to Title IX of the Education Amendments of 1972, UND does not discriminate on the basis of sex in its educational programs and activities, employment and admission. UND will promptly and equitably investigate reports of discrimination or harassment and take disciplinary action as appropriate. Information regarding sexual violence and Title IX can be found at http://UND.edu/affirmative-action/title-ix/.

Sexual and Gender-Based Discrimination and Harassment, including Sexual Violence

UND prohibits discrimination and harassment of students, faculty staff and visitors based upon sex and gender. Sexual harassment is a form of sex discrimination and includes sexual violence, such as rape, dating violence, domestic violence, stalking, sexual abuse, sexual assault, and sexual coercion. Prohibited harassment also includes:

- Acts of verbal, nonverbal or physical aggression, intimidation or hostility based on sex, even if those acts do not involve conduct of a sexual nature
- Sex-based harassment by those of the same sex
- Discrimination and harassment of LGBTQ+ individuals
- Sexual violence

If you have experienced sexual violence or other sex or gender-based discrimination or harassment, you are encouraged to report the incident at http://und.edu/affirmative-action/incident-report.cfm or contact UND’s Title IX Coordinator at 701.777.4171 or by email at donna.smith@UND.edu. UND will take prompt action to eliminate the harassment, prevent its recurrence, and eliminate its effects.

Under Title IX, most UND employees are required to share complaints of sexual violence and sexual harassment with the Title IX Coordinator. They are not allowed to keep a report of sexual violence completely confidential. This is because UND has resources and support available to help. We are concerned for the safety and well-being of the victim as well as the campus and community. This does not mean an investigation or other process will occur against the complainant’s wishes.

Respecting a complainant’s privacy is important to UND. Information will only be shared with individuals who need to know to provide resources for the complainant, to protect the safety of the campus community or for investigative needs. If a complainant does not want his or her name revealed to the respondent, UND will do its best to honor that request. Our ability to fully respond may be limited.

A confidential report of sexual violence can be made on-campus at University Counseling Center, Student Health Services, Community Violence Intervention Center, and UND’s Employee Assistance Program. These offices will not report incidents of sexual violence to the Title IX Coordinator in a way that identifies the complainant without the complainant’s consent. You can make a confidential report and still receive counseling or other services through these departments.

More information about sexual and gender-based violence and Title IX at UND can be found at http://und.edu/affirmative-action/title-ix/ or by contacting UND’s Title IX Coordinator at 701.777.4171 or donna.smith@UND.edu.

UND Statement on Institutional Diversity and Pluralism

Approved by University Senate December 7, 2006

The University of North Dakota takes pride in its mission to meet the individual and group needs of a diverse and pluralistic society through education, research, and service. The peoples served by and associated with the University vary widely; all must be valued for the richness their different cultures, heritages, perspectives, and ideas bring to the community. The University is in part, a conduit through which individual perspectives and global interrelationships are enhanced by a learning and teaching environment that is aware of and sensitive to the diversity of its constituents. Diversity in the University is constituted by the full participation of persons of different racial and ethnic heritage, age, gender, socio-economic background, religion, and sexual orientation; of persons with disabilities; and of people from other countries. Of special and particular importance is the University’s longstanding commitment to the education of American Indian students and the cultures and traditions of the American Indian people. In addition, the University’s commitment to diversity extends to historically underrepresented populations such as African Americans, Latino Americans, and Asian Americans. Furthermore, the University embraces our international student population as they enhance the culturally rich learning environment of campus. The University is committed to providing learning and teaching experiences which enhance all students’ self-determination, educational advantages, and professional opportunities. Policies and procedures of the University oblige its students, faculty, staff, and alumni to foster the awareness and sensitivity necessary for acceptance and understanding of all people in society. The University of North Dakota strongly disapproves and does not tolerate acts of racism, sexism, bigotry, harassment, and violence in any form and actively uses its human and other resources to provide opportunities for its constituents and public to learn and appreciate the values of a diverse and multicultural world.

Disability Access On Campus

The University of North Dakota is committed to providing access to all people using its facilities, programs and services. UND is responsible for making reasonable accommodations and adjustments to ensure there is no discrimination on the basis of disability, as established under Section 504 of the Rehabilitation Act and the Americans with Disabilities Act.

For building access or other physical barriers, contact the Facilities Department 24-hour call line at 701.777.2591 or use Relay 711.

For student accommodations, contact Disability Services for Students at 701.777.3425 und.dss@UND.edu or register with DSS at http://UND.edu/disability-services/.
For employee accommodations, requests should be directed to the employee’s supervisor or the ADA Coordinator at 701.777.4171. An ADA Accommodation request form and related information is located at http://und.edu/affirmative-action/ada.cfm.

**Code of Student Life**

The University of North Dakota *Code of Student Life* (Code) outlines the rights and responsibilities enjoyed by the students who make up the University community. The purpose of the information contained in the *Code of Student Life* is to promote and maintain a learning environment appropriate for an institution of higher education and to serve as a basic guide to help prevent abuse of the rights of others. Members of the University community are expected to be familiar with the policies and processes contained within the *Code* and to act in compliance with them at all times. The *Code* is intended to be a general handbook to give guidance and direction to members of a very diverse University community. Although it is not possible to cover every conceivable situation that might arise, specific questions relating to the *Code* may be directed to the office of Student Rights and Responsibilities or the Office of the Vice President for Student Affairs.

Nothing within the *Code* is intended to limit or restrict freedom of speech or peaceful assembly. You can access the *Code* at: http://und.edu/code-of-student-life/.

**Required Immunization & Tuberculosis Screening Documentation**

Students enrolled in a course offered for credit at any North Dakota University System (NDUS) institution must provide documentation of certain vaccines received and appropriate Tuberculosis (TB) screening as described in North Dakota State Board of Higher Education (SBHE) Policy 506.1. The University of North Dakota requires documentation of the following:

1. 2 doses of MMR (measles, mumps, and rubella) vaccine.
2. 1 dose of Meningitis (Menactra/Menveo) vaccine given after the 16th birthday.
3. Completion of the Tuberculosis (TB) screening form. If a student qualifies as “high risk” according to the screening form, he/she will be required to have TB testing done or provide documentation of TB testing done within the past 6 months performed within the United States.

For more information please contact UND Student Health Services at (701) 777-4500, 1,800.CALL.UND ext. 4500, or visit the UND Student Health Services web page at: http://und.edu/immunizations.

**Security Compliance**

The University of North Dakota is in compliance with the Jeanne Clery Disclosure of Campus Security Policy and Campus Crime Statistics Act (Clery Act) formerly known as the Crime Awareness and Campus Security Act of 1990. The University of North Dakota publishes an Annual Security and Fire Safety Report. The report includes the university’s policies, procedures, and programs concerning safety and security, as well as three years’ of crime statistics for our campus. As a community member, you are entitled to a copy of this report. The report and statistical data can be found online at http://und.edu/discover/files/docs/annual-security-report.pdf. You may also request a paper copy of the report from the UND Police Department located at 3851 Campus Road, Grand Forks, ND, 58202. For more information, contact the UND Department of Public Safety at (701) 777-3491, visit the UND Department of Public Safety web page at: http://und.edu/public-safety/, or e-mail: und.police@email.und.edu.  

**Email Policy**

Electronic mail or “email” is considered an official method for communication at UND because it delivers information in a convenient, timely, cost effective, and environmentally aware manner.

A University assigned student email account shall be the University’s official means of communication with all students on the UND campus. Students can expect to receive official information regarding deadlines, policy/procedure changes, changes in degree requirements, special events, course schedule changes, regulatory changes, emergency notifications, as well as other useful information from the Registrar, Office of Financial Aid, Student Account Services, the Provost’s Office, Dean of Students, the School of Graduate Studies, academic departments, and other entities affiliated with the University. Students are responsible for all information sent to them via their University email account. For additional information, please visit the CIO website at: http://cio.und.edu/.

**Tobacco-Free Campus Policy**

The University of North Dakota is a tobacco-free campus. Tobacco use is prohibited within University buildings, parking structures, walkways, arenas, in University or state vehicles, and on UND property. UND provides comprehensive tobacco cessation and prevention services. See http://www.tobaccofree.und.edu for more information.

**Catalog Content Non-Binding, Subject-to-Change Statement**

Catalogs and bulletins of educational institutions are usually prepared by faculty committees or administrative officers for the purpose of furnishing prospective students and other interested persons with information about their institution. Information contained in such printed material is subject to change without notice, and it is not to be interpreted as creating a binding obligation on the institution and the State. In times of changing conditions, it is especially necessary to have this understood.

**Suggestions and Complaints**

The University welcomes suggestions and/or complaints from students, faculty, and staff, which should be directed to the unit or personnel most directly involved. It is only in this way that the institution can become aware of potential problems and take appropriate action. Also available are anonymous hot lines which deal with general concerns and scientific or ethical misconduct. The URLs are respectively: http://www.und.edu/dept/fraudhotline/index.html and http://www.und.edu/dept/rdc/reporting%20scientificmisconduct.html. The University may review with accrediting agencies a log of anonymously tracked written student complaints.

**Access to Records (Family Educational Rights and Privacy Act)**

In compliance with the Family Educational Rights and Privacy Act of 1974 as amended, the University of North Dakota has developed policy guidelines for access to the education record with respect to the rights of eligible students and parents of dependent eligible students. All information contained in University records is considered confidential, except for directory information, which may be released publicly in printed, electronic, or other form. Directory information is defined in the Code of Student Life in “Section X: Student Records/Directory Information.” Students who wish to restrict their directory information from public release should restrict their information as early in the term as possible. To insure restriction of directory information from the printed material, the process should be completed by the tenth day of classes in the fall semester. To restrict directory information, students should go to the Office of the Registrar, Room 203, Twamley Hall.

**UND Graduation Rate Information**

The University of North Dakota graduation rate information is available online at: www.und.edu/academics/Registrar/graduation-rates.cfm. A paper copy of this report is also available by calling the Office of the Registrar at (701) 777-2711.

THIS CATALOG was published by the University of North Dakota Office of the Registrar, Scott Correll, Registrar, and the UND School of Graduate Studies, Grant McGimpsey, Dean.
Undergraduate Academic Information

New Undergraduate Student Information
Enrollment, admission (p. 14)
Orientation for new students (p. 17)

Undergraduate Academic Information
Degrees granted (p. 18)
Purpose of a University education (p. 18)
Essential Studies Requirement, Transfer Agreement (p. 18)
University graduation requirements (p. 18)
Common Course Numbering, Special Exams (p. 19)
Registration (p. 20)
More information on registration, drop-add, grading, etc. (p. 17)

Undergraduate Programs and Courses
Alphabetical by departments (p. 26)
(Also see the A-Z Index (http://und.edu/a-z) to find the location of more specific subject matter than is listed in this contents.)

New Undergraduate Student Information
Enrollment Information About UND
The following pages of the catalog contain information about admission policies, costs, student financial aid, and housing. The Office of Admissions serves as the central contact point for enrollment information about the University. It provides information to prospective students through printed materials, visits to high schools and college fairs, tours of the UND campus, and personal contact over the telephone, by email or on a face-to-face basis. The mailing address is: Gorecki Alumni Center, 3501 University Avenue, Stop 8357, Grand Forks, ND 58202-8357. The online application can be accessed at go.UND.edu. The office telephone number is 701.777.3000. UND will accept applications up to one year in advance of the semester the student plans to start.

Admission of Freshman (Non-Degree and Early Entry)
Undergraduates may be admitted to the University in one of two categories:
Regular Admission (full-time or part-time); and Non-Degree Seeking Admission. See below for definitions of these admission categories. For provisions governing admission to the School of Graduate Studies, Law School and the School of Medicine and Health Sciences, applicants should consult the respective sections for those schools.

Types of Admission
Regular Admission
Regular Admission is granted to a student who has been determined to be eligible and is duly enrolled as a candidate for a degree.

Non-Degree Seeking Admission
Non-degree Seeking Admission is a special admission status reserved for students who wish to enroll in a limited number of courses at UND. Students admitted with this status will be allowed to attempt up to a total of 15 credits at UND and are not eligible for financial aid. Enrollment in courses beyond 15 credits will be contingent upon meeting all admission criteria for regular admission.

Admission of First-Year Students
Admission
For first-year students, admission is based on the following minimum criteria:
• High school GPA unweighted of 2.75
• ACT of 22 (fall 2017) or SAT of 1100 (fall 2017) scores based on SAT test taken on March 5, 2016 and after (including sub-test scores)
• Completion of the high school core curriculum for college readiness
• Additional factors will be considered, such as course rigor, grade trends, core GPA, etc.
• Completion of safety and security form

Students are encouraged to apply for admission even if their GPA, ACT and safety and security responses do not meet these admissions guidelines. All applications that are not yet eligible for admission will be reviewed by the Office of Admissions, the Student Academic Standards Committee (transcripts, test scores) or the Admissions Safety and Security Committee (criminal history records) to consider all relevant information and extenuating circumstances in order to make an admission decision that is in the best interest of the student and institution.

Students applying for admission to UND are required to take one of the standardized college entrance exams; however, students 25 years of age or older are not required to submit test scores, but these scores may be requested for admission. The ACT or SAT I: Reasoning Test is accepted. Standardized test scores at UND are used for scholarships, placement, and advisement, as well as admission criterion. It is recommended that students take the ACT late in their junior year. Applicants to UND are exempt from the ACT writing essay component under UND campus procedure.

All students who graduate from high school, whether in North Dakota or in any other state, and who are age 25 or older on the first day of class, are exempt from meeting the required core college readiness curriculum before entering any four-year North Dakota University System institution.

Below is the list of core courses at the secondary level which are required for admission for 2017 (total of 14):
• Four units of English, including the development of written and oral skills;
• Three units of mathematics, including Algebra I and above;
• Three units of laboratory science, including at least one unit each in two or more of the following courses: biology, chemistry, physics or physical science;
• Three units of social studies, excluding consumer education, cooperative marketing, orientation to social science and marriage and family.

Note: One additional core course is required for fall 2018 (total of 15).

UND may admit some students who have not completed the required courses. The Student Academics Standards Committee will consider exemptions to the policy because of special circumstances. Students denied admission by the Committee are not permitted to attend UND.

The Office of Admissions may deny applicants who meet the core curriculum requirements but are evaluated to be high-risk candidates for success at UND due to a low ACT, low SAT, low high school grade point average, or any of the other admission criteria listed above.

Students who have not had the required courses are encouraged to enroll in any of North Dakota’s colleges/universities. Upon successful completion of 24 transferable semester credits and a minimum 2.0 GPA, these students may transfer to UND and are exempt from meeting the high school core course requirements.

More information on registration, drop-add, grading, etc. (p. 17)
A student who has not graduated from high school may be admitted to the University by completing the test of General Educational Development (GED). Beginning January 2014 the new GED minimum test score of 145 is required for admission. A minimum score of 410 or above on each exam and an overall average of 500 on the entire test for those tested in 2002 or later. For students testing prior to 2002, an average of 45 and subject scores no lower than 40 are required. For more information regarding GED test content and registration, contact UND Testing Services at (701) 777.4157. GED testing scores are posted on the Admissions website.

The University is approved under Federal law to admit non-immigrant alien students. Students whose education has been outside the United States should make early contact with the Office of Admissions for questions concerning admission.

International students

International students applying for undergraduate admission and all students whose first language is not English are required to earn a score of at least 195 computer-based or 71 Internet-Based on the Test of English as a Foreign Language (TOEFL) and/or 6.0 on the International Language Testing System (IELTS) to be considered for admission to UND as outlined in SBHE policy. The International Programs Office provides assistance and counseling to students from countries other than the United States.

Canadian students

Canadian students are required to complete Grade XII and to meet high school core curriculum admission requirements. They must also complete the ACT or SAT and request that the official results be sent to UND to be eligible to enter the University as freshmen. All students who graduate from high school, and who are age 25 or older on the first day of class, are exempt from meeting the required core college readiness curriculum before entering any four-year North Dakota University System institution.

Early Entry High School Students

Early Entry High School Students are applicants who have taken college-level coursework while in high school. Students may receive credit for courses taken at an accredited university/college while in high school if those courses are acceptable for credit at the University of North Dakota. Courses applied toward College requirements must be approved by the Dean of the College. Courses applied toward major requirements must be approved by the Departmental Chair.

Admission Tests

It is required that each applicant for admission who completes the ACT request that official scores be sent directly from ACT to the Office of Admissions. Students who complete the SAT I: Reasoning Test (SAT) may request official test scores be mailed to the Office of Admissions. The University prefers the ACT report since it provides information, in addition to test results, which is helpful in advising students. It is to the student’s advantage to take the test at the earliest possible test date during the latter part of the junior year.

Information on test dates may be secured from the high school principal, counselor, or the UND Testing Center or any of the colleges in the state.

Advanced Placement

A student from a high school which offers college-level courses through the College Entrance Examination Board Advanced Placement Program may be given University credit and/or advanced standing in individual subjects. This may be especially desirable if he or she wishes to proceed to the next higher level. Under this plan the student takes an advanced placement examination given at his or her school by the College Board. These examinations are scored by the College Board and are forwarded to the college of the student’s choice. The amount of credit given will then be determined by the department best qualified to evaluate the material. Students with special preparation in academic areas (foreign language, etc.) are urged to take advantage of the Special Examinations for credit available in selected disciplines. See the Special Examinations for Credit (p. 19) section.

International Baccalaureate Diploma

The International Baccalaureate Diploma is recognized for the purpose of admission to the University of North Dakota. Specific course credit for advanced standing will be evaluated and determined by the department and college in which the course is offered.

Note to students intending to enroll in mathematics courses: Students planning to take entry-level mathematics courses at UND MATH 92 Algebra Prep II*, MATH 93 Algebra Prep III*, MATH 103 College Algebra, MATH 105 Trigonometry, MATH 146 Applied Calculus I, MATH 165 Calculus I, MATH 208 Discrete Mathematics shall be enrolled in their beginning mathematics courses only after taking a math placement test or receiving a sufficiently high score on the ACT Mathematics test. Students who have received college mathematics credit need not take the placement exam. UND’s Mathematics Department strongly advises all transfer students who plan to take courses in or major in math, to take UND’s Math Placement Exam and to consult with their advisor at UND to help determine the best starting point in UND’s math curriculum.

The mathematics placement tests are used for placement purposes only. Passing these tests does NOT grant credit. Credit for MATH 103 College Algebra and/or MATH 105 Trigonometry without taking the course(s) is available only through CLEP examinations. Two placement exams are used. Students planning to take MATH 165 Calculus I should take the Trigonometry and Elementary Functions Exam. All other students should take the Algebra Exam. Placement test results will determine beginning placement in MATH 92 Algebra Prep II*, MATH 93 Algebra Prep III, MATH 103 College Algebra, MATH 105 Trigonometry, MATH 146 Applied Calculus I, MATH 208 Discrete Mathematics, MATH 165 Calculus I, or MATH 277 Mathematics for Elementary School Teachers. Ask your advisor, or contact the mathematics department, concerning time and place of these tests. * MATH 92 Algebra Prep II and MATH 93 Algebra Prep III credits do not count toward graduation.

Credit by Examination Through CLEP

CLEP stands for College-Level Examination Program of the College Board. It is a national program that offers the opportunity for a student to obtain recognition for college-level achievement based on intensive reading in a particular field, adult school courses, correspondence courses, television or radio courses, courses on tape, or other means of formal or informal preparation. UND accepts credit on CLEP subject examinations only. See the section on CLEP (p. 19) for additional information.

Enrollment in the University

All students will be enrolled, based on their declared major, in one of UND’s academic colleges. Students who have an undeclared major will receive assistance from the Student Success Center. Once a student declares a major, he/she will be enrolled in the appropriate academic college. Enrollment in an academic college does not guarantee admission to the college or specific academic programs. (For more information regarding additional requirements for admission to colleges and programs, see the listings for individual colleges).

How to Apply:

1. The online application for admission can be located on the web at: go.UND.edu (http://und.edu/admissions). The application priority deadline is March 1.
2. All applicants are required to complete the online application and submit the non-refundable $35 application fee. In addition, freshmen must request their high school send an official transcript of their records directly to the Office of Admissions.
3. The freshman applicant is required to take the ACT or SAT and request that the official scores be sent to 3501 University Avenue, Stop 8357, Grand Forks, ND 58202. ACT Scores = UND Code #3218. SAT Scores = UND Code #6878
4. All applicants are required to complete the safety and security questions on the online application.
5. Each applicant must provide the Health History & Immunization Form completed by his or her family physician or mailed from his/her high school. This form is provided online to each accepted student and should be returned to the Student Health Service before enrollment.
6. Beginning fall 2016, all new admitted full-time students who wish to enroll at the University are required to submit a non-refundable $200 confirmation deposit, by May 1 (set by the National Association for College Admission
Admission of Transfer Students

Specific admission requirements for transfer students are based upon the total number of transferable college credits completed from a regionally accredited institution at the time of application.

Transfer students who have completed 24+ transferable semester credits must meet the following criteria to be admitted to UND:

- Have a minimum of a 2.0 cumulative transferable college GPA
- Be in good standing at all college(s) previously attended

If transfer students have less than 24 transferable semester credits (including in-progress work), they must verify high school graduation by submitting all official high school transcripts directly to the UND Office of Admissions. If transfer students have completed fewer than 24 transferable semester credits and are under the age of 25, they must submit official ACT or SAT test scores.

 Applicants who have enrolled in a college or university other than the University of North Dakota and who are applying for admission must submit all required official documents to the Office of Admissions before any information regarding their status will be provided. In addition, students who have attended an institution of higher education outside of the United States, including those who participated in Study Abroad programs, must submit a course-by-course evaluation through World Education Services at: www.wes.org (http://www.wes.org). Most Canadian universities do not require a course-by-course evaluation. A student will be notified if a course-by-course evaluation is needed. All claims for transfer credit must be made within the semester in which the student matriculates.

The Office of the Registrar evaluates and records transfer credit. Students with unsatisfactory records, as well as students who have been asked to withdraw from other institutions due to unsatisfactory scholarship or behavior, ordinarily will not be allowed to enter the University. If special permission for admission is granted, the student is placed on academic probation.

Students who owe money to previous institutions and who cannot submit an official transcript are not eligible for degree seeking admission.

International Student Transfer Admission

International students applying for transfer admission must submit an application for admission, a certification of finances form, and official transcripts/academic records from all post-secondary schools attended. In addition, the Test of English as a Foreign Language (TOEFL), with a score of 195 Computer-Based, 71 Internet-Based, and/or 6.0 on the International Language Testing System (IELTS) for undergraduate students enrolling at a UND as outlined in SBHE policy, is required for all students whose native language is not English.

If transferring from a college or university outside of the United States, a course-by-course evaluation of non-U.S. post-secondary credentials is required. The evaluation form may be obtained at: http://www.wes.org. The WES ICAP evaluation must be submitted in addition to all official transcripts/academic records from all post-secondary schools attended, along with word-for-word English translations.

If transferring from a college or university within the United States, a foreign student advisor reference form is required.

Note: The student will be notified if a course-by-course evaluation is needed from a Canadian university.

Eligibility

Students in good academic standing may apply for admission after completing 24 credits from a regionally accredited institution that they are currently attending. Students who have less than two full-time semesters or less than 24 credits and who are not in good academic standing at their current institution can petition the eligibility for admission after four years of not attending an institution. The transfer student is not at liberty to disregard any part of his or her previous college record. Former students of other institutions may not enter as new freshmen on the basis of secondary school records. Violation of this regulation will be regarded as a serious offense and may result in the student’s dismissal from the University.

Students transferring from outside the state of North Dakota to the University must have maintained at least a “C” average at the colleges or universities which they previously attended. Some colleges in the University require higher averages in selected major programs. These requirements are described in the specific college listing in this catalog.

Transfer Credit

An official transcript from each of the student’s former institutions must be submitted for review. Upon receipt of the student’s transcripts, the Office of the Registrar will determine which credits will transfer as well as how those credits will be applied toward the University of North Dakota’s General Education requirements and/or Essential Studies requirements. How the accepted courses may be used toward the student’s major is determined by the individual college or department from which the student plans to receive his/her degree. Students should read specific information about their school or college requirements in this catalog and should contact an advisor in their major to determine course applicability.

A credit summary, indicating only the number of credits transferred and the institution of origin, will be posted to the student’s University of North Dakota transcript after the student has been admitted to the University. A detailed listing of transferred courses will be available to both student and advisor. All of the student’s previous undergraduate work becomes part of the student’s permanent UND record. All transfer work shown on the student’s official transcript will be summarized in semester credits. Work transferred from institutions that use quarter or other systems will be converted to semester credits.

The University of North Dakota participates in the General Education Requirements Transfer Agreement (GERTA) with other North Dakota institutions. Students who have completed their general education requirements at another North Dakota institution recognized by GERTA should request proof of this completion be sent to the UND Office of the Registrar. Students who have completed an Associates of Arts degree or who have completed their general education requirements at another North Dakota University System (NDUS) institution will be deemed to have completed the general education requirements at UND.

In general, all college-level credit attempted at institutions accredited by a regional or national accrediting organization recognized by the Council for Higher Education Accreditation (CHEA) http://www.chea.org/ including the American Council on Education (ACE) www.acenet.edu (http://www.acenet.edu) will be posted in transfer by UND. There are certain exceptions to this rule, and those exceptions include, but may not be limited to, the following:

1. Remedial or preparatory courses
2. Credit granted for life experience by other institutions
3. Institution-based credit by examination
4. Non-degree continuing education courses

Credit for military courses and training may be granted, but students requesting this credit must produce an official training record. Students should consult the military branch under which they served to have an official copy of this record sent to UND. The American Council on Education’s (ACE) Guide to the Evaluation of Educational Experiences in the Armed Forces will be used to determine whether or not credit is granted and only credit listed as either lower division baccalaureate or upper division baccalaureate credit will be considered.

Students transferring college credit from all institutions outside of the United States, with the exception of Canadian institutions, must have their transcripts evaluated by an international transcript evaluation company prior to being admitted to UND. Students who need more information about how this
evaluation is performed may go online at: http://www.wes.org. Canadian students’ work will be evaluated on-site in the Office of the Registrar.

Credits not successfully completed (grades of F) that would transfer if successfully completed will also transfer to the University and will affect the students’ cumulative grade point average. Transfer students from two-year colleges (junior or community colleges) are required to complete a minimum of 60 semester hours at a four-year college. The last 30 credits toward the degree must be institutional credit at the University of North Dakota.

To qualify for a degree a student must achieve a minimum 2.00 (C) average on all University work. For transfer students, it is required that the overall average (including transfer work) be 2.00 (C) and that the average of work taken at the University of North Dakota be 2.00 (C). Some colleges require a higher grade point average for graduation and this requirement is indicated in the specific college description in this catalog.

How To Apply: The online application for admission can be located on the web at: go.UND.edu (http://www.und.edu/admissions).

1. All applicants are required to complete the online application and submit the non-refundable $35 application fee.
2. Although an applicant’s records from several institutions may be summarized on one transcript, an application will not be considered until official transcripts from each college attended are received directly from the college. These are required even though no credit may have been earned at an institution.
3. Students who have earned fewer than 60 transferable semester credits must submit a high school transcript. Students with fewer than 24 transferable semester credits are required to submit their official ACT UND school code (#3218) or SAT UND school code (#6878) to UND. If students are 25 years of age or older on the first day of class, they are not required to submit their ACT or SAT scores. However, if they’ve taken either exam, it’s highly recommended that they submit their official scores for proper placement into English and math courses. All official documents should be mailed directly from the high school and college and testing center to the Office of Admissions at 3501 University Avenue, Stop 8357, Grand Forks, ND 58202.
4. All applicants are required to complete the safety and security questions on the online application.
5. Each applicant must provide the Health History & Immunization Form completed by his or her family physician or mailed from his/her high school. This form is provided online to each accepted student and should be returned to the Student Health Services before enrollment.
6. Beginning fall 2016, all new admitted full-time students who wish to enroll at the University are required to submit a non-refundable $200 confirmation deposit, by May 1 (set by the National Association for College Admission Counseling) to reserve their seat. The deposit will be applied to their tuition bills. Students can still confirm after May 1 priority deadline, space permitting.

When to Apply: A transfer applicant may submit an application as soon as he or she has graduated from high school or has received a high school transcript. Students must be 16 years of age or older at the time of application to UND.

Undergraduate Academic Information

Introduction and Background

This section of the catalog summarizes many of the academic policies and procedures which will apply to the student during his or her undergraduate years at UND. Particularly important are the passages describing the University’s essential studies program. Since institutional policies may change between catalog publication dates, students are encouraged to consult with their academic advisor whenever appropriate. Students with questions also should request information from their academic department, the dean’s office of their college, and the various administrative offices on campus.

Before utilizing the information found in this catalog, it may be useful to review the following basic patterns of undergraduate education at the University of North Dakota.

The Student’s place in the University organization

New students are admitted, according to the major they wish to pursue, to one of UND’s undergraduate degree granting colleges, e.g., Arts and Sciences. All students who have an “undeclared” major under General Studies in the College of Arts and Sciences will receive assistance from the Student Success Center. Once a student declares a major they will be enrolled in the undergraduate degree granting colleges for that major. Each college is made up of a group of academic departments and/or program areas (e.g., history). Courses in the student’s major will normally be taken in a specific department, although UND offers many interdisciplinary majors as well. It should be noted that course work in one’s major field normally makes up only a fraction of the total credits required for graduation (typically about one-fourth). Thus, throughout their undergraduate days, students have the opportunity to take courses in many departments outside their home college. Indeed, this diversity is one of the advantages of attending a multipurpose university such as UND.

As an institution of higher education, the university is committed to ongoing assessment of student learning at all levels and in all programs. Assessment of student learning is essential in order for the university to improve educational programs and the experiences of students. Students are urged to respond positively when asked to participate in assessment activities. Students are also encouraged to collaborate in the planning and development of assessment activities and to make suggestions for improvements.

Orientation Programs for New Students

The University of North Dakota holds orientation programs for new students (freshmen and transfer students) each semester. The emphasis is on acquainting students with people, programs and resources at UND and the surrounding community, along with an opportunity to register for courses and interact with academic colleges and departments. New students will be informed of the dates, times and specific details. Orientation information can also be found at: www.und.edu/orientation.

Readmission of Former Undergraduate Students

Undergraduate students who leave the University for at least one complete semester (excluding summer terms) are required to submit an application for readmission to the Office of the Registrar. (Returning graduate students should refer to the Graduate (p. 305) section.) Readmission to the University does not guarantee readmission to a particular degree program at UND. The Request for Readmission form is available from the UND Office of the Registrar website or upon request from the Office of the Registrar. Students who were previously suspended from the University must be reinstated by the dean of the school or college to which they wish to be admitted before applying for readmission. Students who were previously dismissed from the University must petition for reinstatement to the Student Academic Standards Committee. Submit the petition to the Office of the Registrar, 201 Twamley Hall.

Students who have enrolled in courses from other institutions during their time away from UND must have official transcripts sent from each institution attended. Failure to declare attendance at another institution is cause for dismissal and may result in cancellation of registration or any earned degrees to be revoked. Students whose institutional and cumulative GPA’s are below 2.00 based on all post-secondary work accepted by the University may be denied readmission or may be readmitted on probation. Students whose GPA is under 2.00 will be allowed readmission to UND only upon the approval of the dean of their prospective school or college.

University of North Dakota
University, college and departmental requirements

Undergraduate students must meet three sets of requirements to graduate from the University of North Dakota:

1. University graduation requirements,
2. requirements of the UND college or school granting the student’s degree, and
3. the requirements of the student’s major department or program area.

Which catalog to use

The graduation requirements of the University and its colleges, schools, and departments, as published in the catalog in effect at the beginning of the first semester the student is enrolled at the University, are those which must be met for completion of an undergraduate degree program. Subsequent changes in policies and requirements, as published in the catalog or amended by the University Senate and the Board of Higher Education, may be substituted. The faculty reserves the right to make changes in curricula at any time when in its judgment such changes are for the best interests of the students. Courses listed in this catalog are subject to change through normal academic channels. New courses and changes in existing course work are initiated by the responsible departments or programs and are approved by the appropriate dean and college or school curriculum committee, the University Curriculum Committee, the University Senate, the Vice President for Academic Affairs, and the Board of Higher Education.

Advisement

The University encourages continuing communication between faculty and students to enhance the advisement process. The student has final responsibility to meet the stated requirements for the degree sought, as listed in the appropriate catalog or bulletin. Every student is held accountable for complying with the information contained in this catalog and the Schedule of Courses for each term. The University provides an electronic degree audit for each student as a guide and for discussion with the academic advisor. Registration is the student’s personal responsibility.

Academic Advising Philosophy Statement

Academic Advising is an integral component of undergraduate education at the University of North Dakota. The focus of all academic advising is to assist students in taking responsibility for developing meaningful educational plans which are compatible with their life goals. It is a decision-making process by both student and academic advisor. The sharing of information occurs in a caring and comfortable environment which promotes responsible and appropriate academic choices. Through a quality advising process, academic advisors strive to facilitate a successful academic experience for students. Successful advising is an interactive relationship in which both student and advisor must take responsibility for a successful outcome.

Degrees Granted

The University of North Dakota offers both undergraduate and graduate courses of study leading to degrees in many academic disciplines. See the section of undergraduate majors and minors (p. 26) for specific listings. Curricula for specific majors will be found in the Courses of Instruction section of this catalog.

See the section about the School of Graduate Studies (https://und.edu/academics/graduate-school) for a description of graduate degrees and a listing of the fields of study open to graduate students. Sections of the graduate professional Schools of Law and Medicine also are included. The two professional schools publish separate bulletins, which are available upon request.

The Purposes of a University Education

UND’s Philosophy of Essential Studies

As a Liberal Arts institution, UND believes that the Essential Studies (General Education) program is the foundation of a student’s degree, regardless of their specific major. While completing their Essential Studies courses, students are encouraged to explore a range of content areas and to develop broad learning abilities. Students’ Essential Studies courses should anchor their future university work and provide a model for life-long learning. Students are encouraged to consult with their academic advisor when choosing Essential Studies courses and to be particularly mindful of the ES program’s special emphasis on specific learning skills. (These courses are designated on the website.) Finally, all UND Students will complete an Essential Studies Capstone course, to be taken no earlier than the second semester of their junior year. By choosing courses that complement each other, students can reinforce and enhance the knowledge and abilities acquired in each course, as well as develop the ability to recognize relationships.

Oversight of the Essential Studies Program is the responsibility of the Senate Essential Studies Committee, a committee of the University Senate comprising student, faculty, and administrative representatives from across campus. UND’s full philosophy of Essential Studies, the specific requirements of the program, as well as the current and archival lists of courses (http://und.edu/academics/essential-studies/approved-courses.cfm) that satisfy the requirements, can be found at the ES committee website: http://und.edu/academics/essential-studies/.

The North Dakota University System Transfer Agreement

The University of North Dakota participates in the General Education Requirements Transfer Agreement (GERTA) with other North Dakota institutions and the NDUS transfer agreements with Washington, Oregon, the South Dakota system, the Montana University system, MnSCU institutions, Wyoming Community Colleges, and California Community Colleges. For more information, details, and qualifications for the state articulation agreements, check: www.ndus.edu/makers/procedures/ndus (http://www.ndus.edu/makers/procedures/ndus), 400s Academic Affairs.

University Graduation Requirements

A minimum of 120 semester hours of credit is required for a baccalaureate degree. Thirty credits must be UND institutional credit. Institutional credit is academic credit awarded by the University. The following sections describe the requirements which must be met by all students seeking the baccalaureate degree. These include regulations concerning majors, minors, grade point average, upper division courses, and residence.

I. Essential Studies Program Requirements

An overview of the philosophy guiding the Essential Studies portion of the University’s graduation requirements is provided in the immediately preceding section of the catalog. The complete philosophy statement and the specific goals of the Essential Studies program are found at http://und.edu/academics/essential-studies/. The courses that can be used to satisfy the Essential Studies graduation requirements can be found at: http://und.edu/academics/essential-studies/approved-courses.cfm.

II. Upper Division Courses Required

A minimum of 36 semester credit hours must be completed in upper division courses by all undergraduate degree recipients. All courses numbered 300 and above and taken at a four-year institution are defined as upper division.
III. Majors

The specific requirements of a major or related fields concentration are determined by the department or program responsible for the major or concentration subject to approval by the University Curriculum Committee. A major requires at least 32 credit hours related to an academic area.

IV. Program Sub-plans

A sub-plan is a group of courses within an approved academic degree program or major which is identified in the institutional catalog. Sub-plans are either transcriptable or non-transcriptable. Transcriptable sub-plans (options, specialization, emphases, concentrations or tracks) require a minimum of 16 undergraduate distinct credit hours or a minimum of 9 graduate distinct credit hours.

V. Minors

Minors shall consist of a minimum of 16 semester hours of coursework with the course distribution established by the appropriate department or departments with the approval of the University Curriculum Committee. Minors may consist of courses associated with a department or discipline, e.g., chemistry; a specialty within a department, e.g., office administration, etc.; or a collection of courses which cross disciplines, e.g., international studies. A minor is not required by the University but may be required in some programs for an undergraduate degree. A student may declare a minor in the office of the dean of the college in which the minor is offered.

VI. Program Certificate

A program certificate is a specialized course of study requiring at least 9 credit hours at the undergraduate level.

VII. Double Use of Courses

1. Courses within a major or required by a program may, at the same time, fulfill Essential Studies Requirements for the University. (There are a few exceptions to this general rule. These exceptions are stated under departmental requirements, for example under the Communication program.)

2. In certain cases courses may count toward a major (or minor) and, at the same time, fulfill "Extradedpartmental Requirements" for another major or program. Consult college or departmental offices for more information.

VIII. Grade Point Average

To qualify for a degree a student must achieve a minimum 2.00 (C) average on all University work. For students with transfer work, it is required that the overall average (including transfer work) be 2.00 (C) and that the average work taken at the University of North Dakota be 2.00 (C). Some undergraduate colleges require higher averages. (See requirements under specific college information.)

All UND coursework applied to the major or minor must average 2.0 or above; all coursework applied to the major or minor including transfer work must also average 2.0 or above. Certain colleges or majors/minors may require a higher GPA.

IV. Residence Requirements

A candidate for the bachelor’s degree who enters with transfer credit must obtain from the University a minimum of 30 semester hours of institutional credit. Fifteen semester credits in the student's major and three semester credits in the minor, if a minor is declared, must be institutional credit. Some colleges of the University may require more than 15 hours of institutional credit in the major.

Institutional Credit includes degree credit courses:

1. taken in residence;
2. taken through Continuing Education.

Credits earned by examination, e.g., Foreign Language Placement and Special Examination for Credit, do not count as Institutional Credit.

Exceptions to General Graduation Requirements

Any exception to the above general degree requirements must be requested by the student at least six weeks prior to his or her expected graduation date. Petitions must be initiated in the office of the student’s dean.

Formal Application for the Degree Sought

Candidates for degrees should make online application within the first four weeks of the semester in which the student expects to receive the degree. The application is available in Campus Connection. Students applying for two or more degrees to be awarded simultaneously must apply separately for each degree and receive approval from each college granting the degrees.

Conferring of Additional Baccalaureate Degrees

Second baccalaureate degrees may be earned by completing the requirements for the degree without regard to previous baccalaureate degrees earned at UND.

Early Graduation Policy

Students meeting all of the requirements for graduation except approval by the University Senate who: 1) complete an internship or co-op which is required for the degree at a time inconsistent with the normal academic calendar, and 2) need an official transcript certifying the awarding of a degree for official licensure or certification as a condition of employment, may appeal to the Senate Executive Committee to obtain a transcript reflecting graduation. If granted, the Registrar's Office posts both the degree and a graduation date different from the one graduation date established by the University as required by the State Board of Higher Education on the academic record.

Major Declaration Policy, Common Course Numbers, Special Exams

Major Declaration Policy

In order to progress toward the timely and successful completion of an undergraduate degree, it is in the best interest of students at the University of North Dakota to declare a major early in their academic career. During the semester in which a General Studies: Undeclared student will reach 45 undergraduate credit hours (typically the third semester), a Major Declaration notice will be added to the student’s To Do list in Campus Connection. In addition, the student Success Center will use multiple means of communication and connect a student to resources to assist in exploring program of study options. This notification will prompt a student to take the necessary steps to move from General Studies: Undeclared, and begin working with an advisor in the program of study the student plans to pursue.

Upon reaching 60 credit hours in a General Studies: Undeclared status, a negative service indicator hold will be placed on a student's account prohibiting registration for the following semester until a program of study other than General Studies: Undeclared is chosen. The Student Success Center will further assist the student through additional communication and contact to prompt major declaration. Once a major is declared, the negative service indicator hold will be removed by the Student Success Center, allowing the student to register for courses based on the intended program of study. A student who has reached 60 or more credit hours would be allowed to retain or move to General Studies: Undeclared status only with permission from the Student Success Center.

Common Course Numbers

All universities and colleges in the North Dakota University System (NDUS) have agreed on Common Course Numbers (CCNs) for many of the courses they have in common. A list of the common courses can be found on the North Dakota University System website at: www.ndus.edu/system (http://www.ndus.edu/system).
Special Examinations for Credit

A regularly enrolled student may apply to take “special” (challenge or validating) examinations to establish credit for approved University courses. Requests to take an examination must be made to the chair of the department offering the course. Approval of the department chair, the instructor of the course and the dean of the college offering the course(s) are required. A petition with the appropriate signatures must be submitted to the Office of the Registrar prior to examinations. A committee of three appointed by the chair of the department offering the course will administer and evaluate the examinations, a majority being necessary to award a grade. Special examinations must be searching and comprehensive. Grades of “Satisfactory” or “Unsatisfactory” will be recorded on the student’s permanent record upon recommendation of the committee, but will not be used to compute scholastic average.

The fee per credit hour for a validating or challenge examination is one-half the regular credit hour fee for the course to be challenged. Receipt of payment must be presented to the instructor prior to examination.

Students may apply to take challenge or validating examinations to establish credit in University of North Dakota courses that correspond to work taken at institutions that are not regionally accredited, or for courses in which they have superior preparation or knowledge gained through prior learning or independent study. These exams are offered for courses which have no equivalent CLEP subject exams. Students who have audited a course, or who have previously enrolled in a course and then dropped it, will not ordinarily be permitted to take a special examination in that course.

College-Level Examination Program

The University of North Dakota offers the opportunity to submit the results of CLEP for credit in most of the Subject Examinations.

CLEP Subject Examinations currently accepted by UND for transfer credits with minimum acceptable standard scores can be found at: [www.ndus.edu/students/earn-credit-by-exam](http://www.ndus.edu/students/earn-credit-by-exam). Credit earned through CLEP Subject Exams may be used to fulfill University Essential Studies requirements, to fulfill specific course requirements, or to be used as elective credits. CLEP credit will not satisfy Essential Studies Special Emphasis requirements. As soon as they become available, new examinations will be reviewed by University departments to determine their suitability for credit at UND.

The following guidelines have been established for utilization of the Subject Examinations:

1. A CLEP Subject Examination may not be taken to establish credit for a course in which a student has earned credit in a higher level sequential course.
2. Regarding CLEP Subject Examinations which offer a maximum of six to eight credits, a student with previously earned credit in one semester of a two-semester sequence must petition the CLEP Advanced Placement Committee for exception to this policy prior to taking the CLEP Subject Examination for the balance of the credit. Credit earned through CLEP Subject Examinations currently accepted by UND for transfer credits with minimum acceptable standard scores can be found at: [www.ndus.edu/students/earn-credit-by-exam](http://www.ndus.edu/students/earn-credit-by-exam).
3. A Subject Examination may be repeated no sooner than six months after date of the last testing. Students should submit a petition to the UND CLEP Committee for permission to repeat an examination.
4. A Subject Examination may not be taken to establish credit in a subject in which the student has been enrolled, but from which he or she has withdrawn after the last day to add a course, until six months from the last class day of the term in which he/she was enrolled for the course.
5. A Subject Examination may not be used to establish credit in a subject in which the student has previously failed. In addition, a Subject Exam may not be used to repeat a course.
6. CLEP credit is considered as equivalent to credit earned at another institution. UND students must earn 30 credits at UND. UND uses the ACE Recommended Credit-Granting Score as a guide to determine whether credit is granted.
7. For a listing of approved examinations, required scores, and transfer equivalents, go to: [www.ndus.edu/students/earn-credit-by-exam](http://www.ndus.edu/students/earn-credit-by-exam).

Foreign Language Placement & Credit Test

Students with a background in a foreign language may receive credit by taking a test in that language through the University of North Dakota Testing Center. UND strongly recommends that students take this test during pre-registration or registration. Students who are enrolled in a language course and wish to take the Foreign Language Placement & Credit Test in that language must take it during the first two weeks of the semester. Credits earned through the Foreign Language Placement & Credit Test do not satisfy any Essential Studies Special Emphasis requirements.

Credit earned through College Level Examination Program (CLEP) tests may be recognized by UND (see CLEP (p. 14) listing), and students who have completed French, German, Latin, or Spanish Advanced Placement (AP) courses with appropriate scores may also receive credit. This credit is normally equivalent to Levels I and II in that language (see Advanced Placement (p. 14) listing). Neither CLEP credit nor AP credit will satisfy any Essential Studies Special Emphasis requirements.

Native speakers of a language other than English who wish to take classes in that language may enroll without special permission in any 400-level course, or in any 300-level course that emphasizes literary or cultural topics. Incoming students whose native language (as indicated on their TOEFL exam) is one offered at UND should consult the Chair of the Department of Modern & Classical Languages & Literature about an automatic waiver of the language placement examination.

Cooperative Education

Cooperative Education is an academic program that provides students with opportunities to both integrate and combine their course learning with practical, professional work experience in their chosen field of study. Cooperative Education experiences allow students to secure salaried, career-related work experiences under the supervision of both a sponsoring employer and the appropriate academic department, while at the same time receiving academic credit. The program is based on the belief that learning extends beyond the classroom and that the combination of course learning and practical work experience provides an innovative and comprehensive education.

Students spend from 3-9 months on Cooperative Education assignment. Academic credit is granted by the participating academic department through the student’s enrollment in the department’s course titled, Cooperative Education 397. For part-time coop where the student works a minimum of 20 hours per week, the student will enroll in Cooperative Education 397 for 1 academic credit but will be considered half-time for financial aid and enrollment reporting purposes. For full-time coop, where the student works full-time, usually a minimum of 40 hours per week, the student will enroll in 2 academic credits but will be considered full-time for financial aid and enrollment reporting purposes.

The Cooperative Education Program, a part of Career Services, is located in McCannel Hall, Room 280. For information, call 777-4105.

Registration

The academic year calendars giving the dates of registration appear at the beginning of the catalog. Details concerning the registration procedure are given in the Semester Information, which is available at: [www.und.edu/academics/registrar](http://www.und.edu/academics/registrar). The University of North Dakota complies with NDUS Policy 402.1.2, for placement into Math and English. Students must be registered to attend a class. A student accepts responsibility for payment of tuition and fees when he/she registers in classes at the University of North Dakota.

Change of Registration

After a student has registered, he or she should consult with his or her advisor before changing the registration. Students should be aware that all drops after the first day of class could affect their ability to have financial aid in future terms. The last day to drop a full-term course for all students is on the Friday four weeks preceding the last class day of each term. (See also Summer Sessions deadlines on the academic year calendar [https://und.edu/one-stop/academic-
The last day to drop a class of less than the full semester in length (a mini-class) is a day two-thirds of the duration of the class.

If a course is dropped within the first 10 calendar days of the semester, no indication of enrollment is made on the student’s permanent academic record. If a course is dropped after the first 10 calendar days of the semester, the enrollment is recorded on the student’s permanent academic record and a “W” is entered in the grade column. However, all courses for which the student is enrolled after the tenth day of the term will count toward their satisfactory progress for financial aid.

No change in registration involving addition of a new course or a change of sections is permitted after the tenth calendar day of instruction of the semester (except during Summer Session). Changes to or from credit to audit is the last day to add. Changes to or from S-U grading are permitted until the last day to drop the course. The specific deadlines for the various types of changes of registration are published in the Semester Information each semester at: www.und.edu/academics/registrar.

Verifying student participation for dropped courses, official withdrawals, and unofficial withdrawals:

Students who drop courses, officially withdraw, or unofficially withdraw will have their financial aid eligibility reviewed due to their change in enrollment. Federal regulations require that students who receive federal financial aid must attend or academically participate in the number of credits for which they received financial aid for.

A new requirement for faculty has been added to the grade roster program pursuant to Federal Financial Aid monitoring regulations that will affect any final grade rosters in which a grade of F or U is assigned.

There are now 3 varieties of F and U grades:

1. A grade entered as F (or U) means that the student finished the course but earned a failing grade.
2. A grade entered as FNN (or UNN) means that the student never participated in the class and never dropped it and must therefore receive a failing grade.
3. A grade entered as FN (or UN) means that the student did participate in the class, but stopped attending/participating at some point. In this case, the system will require you to enter a date of last participation for the student, and will not let you change the status of the roster to “approved” unless you do so. Please keep this in mind for any classes where you will be entering a failing grade for any student who is failing because they stopped attending/participating.

Note that FN and FNN will print as a grade of F on the student’s transcript (and the UN and UNN will print as U), but the different types of F and U grades will remain on the roster record to allow Financial Aid to obtain “attendance” information that they are required to monitor.

Some examples of “attendance” or “attendance at an academically-related activity” include:

- Physical class attendance where there is an opportunity for direct interaction between instructor and students
- Submission of an academic assignment
- Taking an exam, completing an interactive tutorial, or participating in computer-assisted instruction
- Attending a study group that is assigned by the school
- Participation in an online discussion about academic matters
- Initiating contact with a faculty member to ask a question about the academic subject studied in the course

Please advise students to contact the Financial Aid Office before they drop a course or officially withdraw from the University as we can discuss how it may negatively impact their financial aid.

Instructor’s Drop Policy

An instructor may submit a list of students to be deleted from class roles who have neither attended class nor notified the instructor of withdrawal within the first five days from commencement of University instruction. The Registrar will delete from the class rolls the names of students and will send a notice to each student dropped from a course in this manner.

Not all instructors follow this policy since it is not mandatory. Students, therefore, are strongly advised not to assume that they have been dropped from a course. Students should review their registration status in a course in question through Campus Connection.

Withdrawal from University

A student wishing to withdraw from the University before the end of a semester must complete a Cancellation/Withdrawal Form located at: und.edu/academics/registrar/forms.cfm. Questions regarding the process can be directed to the Office of the Registrar.

The last day a student may withdraw registration without grades, but with a “W,” is the Friday four weeks preceding the last class day of the term. (See also Summer Sessions deadlines (https://und.edu/one-stop/academic-calendar)). After that time a student should continue classes to completion. An exception to this rule is that a student may have his or her registration withdrawn without grades, but with a “W,” for cause (major mental or physical illness or other significant incapacity) providing both the student’s Academic Dean and the Associate Vice President for Student Services agree to this course of action. Please note: Any withdrawal within the first ten calendar days of the semester reflects on the transcript as “withdrawn” and the date. Anytime a student withdraws after the first ten calendar days of the semester, a “W” grade for each course, indicating the withdrawal, will appear on the student’s transcript. All courses in which the student was enrolled on the first day of the term will be considered when assessing satisfactory progress for financial aid purposes.

A student who leaves the University without obtaining an official withdrawal is given an “F” in all courses.

The Grading System

At the close of a session or upon the completion of a course, each instructor reports a letter grade indicating the quality of a student’s work in the course. Grade points are assigned for each semester hour of credit earned, according to the following grading system:

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>Explanation</th>
<th>Grade Pts. Per Sem. Hr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Marked Excellence</td>
<td>4</td>
</tr>
<tr>
<td>B</td>
<td>Superior</td>
<td>3</td>
</tr>
<tr>
<td>C</td>
<td>Average</td>
<td>2</td>
</tr>
<tr>
<td>D</td>
<td>Passing but low</td>
<td>1</td>
</tr>
<tr>
<td>F</td>
<td>Failure</td>
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</tr>
<tr>
<td>I</td>
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<td></td>
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<tr>
<td>S</td>
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<tr>
<td>U</td>
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<tr>
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<tr>
<td>SP</td>
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<td></td>
</tr>
<tr>
<td>UP</td>
<td>Unsatisfactory Progress</td>
<td></td>
</tr>
</tbody>
</table>

Auditors

Students wishing to enroll in University classes as auditors must seek and receive the prior written consent of the instructor. They must also, at that time, learn from the instructor what will be expected of them or allowed as an auditor. The earliest date to add an audit is the first day of class. The regular deadline for adding a class will also be the deadline for all of the following:
1. adding a class as an audit;  
2. changing from grade to audit; and  
3. changing from audit to grade.

Auditors have no claim on the time or service of the instructor. Normally, auditors will be expected to attend, but not required to participate in the oral or written work of the class. If they are allowed to take examinations, the exams would normally not be graded. It is up to the instructor, however, to determine the appropriate requirements or restrictions for auditors for any given course.

If students fulfill the expected requirements, their transcript will show no credit for the class, but a designation of “AU.” If they do not meet expectations, a grade of “WAU” will be entered on their transcript. Auditors are identified to the instructor on the official class list. An auditor may not later establish credit in that course by taking a special examination. The course must be repeated to earn credit. Audited courses do not count toward class load for financial aid or other purposes.

Incomplete Grades

It is expected that students will complete all requirements for a course during the time frame of the course. For reasons beyond a student’s control, and upon request by the student or on behalf of the student, an incomplete grade may be assigned by the instructor when there is reasonable certainty the student will successfully complete the course without retaking it. The mark “I,” “Incomplete,” will be assigned only to the student who has been in attendance and has done satisfactory work up to a time within four weeks of the close of the semester, including the examination period, and whose work is incomplete for reasons satisfactory to his or her instructor.

Incompletes are entered on the final grade roster, and instructors must submit by email a “Report of Incomplete Grade” form to the Office of the Registrar. The instructor may choose any one of the following options for the deadline to complete the course:

1. The default date as stated in the “UND Schedule of Courses.”
2. Extend to 12 calendar months after the end of the course.
3. A date of the instructor’s choosing no later than 12 months after the end of the course.

Incomplete grades will convert to a grade of “FI” if a grade or incomplete extension is not submitted by the instructor to the Office of the Registrar on or before the deadline written on the “Report of Incomplete Grade” form.

The instructor of the course and the dean of the college offering the course for undergraduates or the dean of the School of Graduate Studies for graduate students must approve and sign the “Report of Incomplete Grade” form for any extension of incomplete beyond the default date listed in the “UND Schedule of Courses.” An incomplete grade must be changed by 12 calendar months from the ending date of the class. It is the student’s responsibility to contact their instructor about an incomplete grade posted on the final grade report.

An “I” may be converted as indicated above but cannot be expunged from the record. Students may not register in courses in which they currently hold grades of incomplete, except for courses that allow repeated enrollment. A student will not be allowed to graduate with an unconverted incomplete grade on the academic record.

In Progress Grades

The School of Graduate Studies, Honors Program, or a specially approved classes, may assign a grade of “SP,” Satisfactory Progress or “UP” Unsatisfactory Progress to courses as Honors Thesis (489), Thesis (998), Dissertation (999), Independent Study (997), ENGL 591 Readings for Ph.D. Comprehensive Examinations, Professional Exhibition (ART 599 Professional Exhibition), or Research (leading to the thesis or dissertation). The “SP” or the “UP” grade for these activities, which usually span several sessions, must remain on the record or may be replaced at the conclusion of the activity, usually a student’s final semester. Grades of “SP” or “UP” are not calculated into term or cumulative GPA values and may be expunged from the record upon submission of final grades in some cases.

Grade Changes

Grade changes must be submitted to the Registrar’s Office no later than twelve months after the course has ended and are to be signed by the instructor and dean or dean designee. Grade changes after twelve months or grade changes resulting from student request are to be approved by the Administrative Procedures Committee. All other grade changes are processed upon receipt by the Registrar’s Office.

S-U Grades

Grades of S or U rather than the traditional grades of A through F are used by the University under regulations specified. A grade of S grants credit toward graduation but does not affect a student’s grade point average except as outlined below in item number 4. A grade of U also does not affect the grade point average and does not grant credit toward graduation.

Elective S-U Enrollment

A student of sophomore, junior or senior standing (as determined by the Registrar) may elect to enroll in one or more courses per semester for S-U grading subject to the following regulations. Students with fewer than 24 completed credits may elect S-U grading only with the permission of their advisor and dean.

1. A maximum of 30 semester hours of credit of elected S-U grades may be counted toward his or her baccalaureate degree.
2. Students may not elect S-U grading for courses in their major. (This restriction does not apply to those courses that have only S-U grading.) In the event a student wishes to major in a field in which he/she has taken a required course for an S-U grade, the department, with the approval of the Academic Dean, may (a) accept the S-U grade, (b) select an additional class to substitute or (c) request the Registrar’s Office to change the S or U to the letter grade submitted by the instructor.
3. A student may take extra-departmental major requirements for an S-U grade with the approval of the major department chair and his/her Academic Dean.
4. Repeating a course by S-U registration will eliminate the effects of the earlier grade from a student’s grade point average if the achieved result is an S. Repetition, which results in a U, will leave the effects of the earlier grade intact.

Class rolls and grade sheets will not identify students who are enrolled for S-U grading. Grades of A, B, and C will be converted by the Office of the Registrar to a grade of S. Grades of D and F will be converted to U. Changes in registration to or from S-U grading may, with the approval of the advisor, be made up to the last day to drop the course.

Students who utilize the S-U grading system are cautioned that they may encounter difficulty in having such credit accepted or evaluated, should they attempt to transfer credit to another university, change majors, or make application for graduate or professional study.

Required S-U Courses

Some courses, as approved by the University Curriculum Committee, will be offered by S-U grading only. The restrictions on Elective S-U courses do not apply to these Required S-U courses. These courses may be taken in excess of the 30 hour limitation.

Repetition of Courses

Students generally may repeat courses to attempt to receive a better grade, but restrictions may apply. Individual colleges may limit the number of times that a course may be taken, and may not allow repeats of C or better grades. Examinations for credit, e.g., CLEP, AP, IB, DSS and Foreign Language Placement and Credit Test, may not repeat course grades.

If a course repetition is taken for traditional A through F letter grading, the highest grade achieved in the course will be used in calculating the student’s grade point average. Repeating an approved course with S-U grading will eliminate the effects of previous credits from the student’s GPA if the achieved result is an S, but repetition which results in a U will leave the effects of the earlier grade intact.

Please note: New Federal regulations may not permit financial aid to be used to pay for a repeat of an already passed course. Please contact the Financial Aid Office regarding questions.
While courses may be taken again after a student has graduated, these will not serve to repeat older grades: the older grades will still be counted in the Grade Point Average.

If a student has previously passed the course twice with a “D” or higher, that course will not be counted for federal financial aid.

Raising a “D” Grade
To raise a D grade, a student may have the alternative of retaking a final examination at the time of the first regularly scheduled final examination in the subject if it meets with the approval of the department and dean of the course and the student’s advisor, except in the School of Graduate Studies, School of Law, the School of Medicine and Health Sciences, and the College of Nursing and Professional Disciplines. If a student decides to retake the final examination, approval must be obtained from the instructor and department chair of the course and the dean of the college offering the course. No re-examination will be given except at the time of the regularly scheduled examinations at the end of each semester.

Grade Forgiveness
Currently enrolled undergraduate students who have interrupted their college/university education for a period of seven years or more, may petition to exclude all previous grades from GPA calculations. The student may not select certain courses to be part of the seven-year rule, but must include all courses which are seven years or older. Such courses and their actual grades would appear on the student’s academic record, but letter grades would not be calculated for GPA purposes. Excluded courses could not be used to satisfy any academic requirement.

A student requesting this option must have a written petition approved by the student’s academic advisor, department chairperson, and Dean of the college from which the degree is sought. If the student changes degree college after approval of this petition, the student would be required to petition again.

Deficiency Reports
Individual mid-term reports of unsatisfactory work (i.e., D, F, and U) of students are made by all instructors at the end of the first eight weeks of the semester. A grade of D is considered unsatisfactory although it is a passing grade. The Registrar sends deficiency reports to students who have been reported deficient. Reports of deficiency are also sent to the academic deans and advisors to be used for advisement purposes. Deficiency grades do not appear on the student’s permanent record. It is also the student’s responsibility to keep informed of his/her own performance in a class.

Semester Grade Reports
Grade reports are available to students by accessing their records after term grades are posted through UND CampusConnection. Grade reports are not mailed, but a printed copy is available upon written request.

Transcripts of Academic Records
Official transcript requests must now be submitted via the web. The web service is available 24/7 and provides online tracking and messaging. All transcript ordering information, including a link to the website, is located at: www.und.edu/dept/registrar/trans/requestonline. The cost per transcript is $12. There is an additional charge for services such as Federal Express delivery. Each transcript includes the student’s entire academic record to date and current academic status. Partial transcripts are not issued. Questions should be directed to the Office of the Registrar.

A request for a transcript of credits by a student who is in debt to the University will not be honored until the indebtedness has been paid.

A transcript covering a student’s previous secondary and post-secondary education that has been submitted to the University as a requirement for admission becomes part of the official file and cannot be recalled by the student. Any student who desires transcripts of work earned elsewhere must order official transcripts from the institution at which the work was taken. The University of North Dakota does not issue nor certify copies of transcripts from other institutions.

Students in Debt to the University
A student who is in debt to the University shall not be permitted to early register or register in the University and shall not be entitled to receive a transcript of credits or a diploma until the indebtedness has been paid in full.

University Attendance Policy and Procedure
Attendance and participation in class activities are considered integral parts of a university education. It is the University policy that attendance in classes is expected of all students. If attendance and/or participation are required and will impact grading, it is the responsibility of the instructor to communicate clearly that policy to students during the first week of class in the course syllabus.

Even in situations where an instructor might excuse a class absence, e.g., severe medical situations, family emergencies, military service, or authorized University activities, it is the responsibility of the student, whenever possible, to inform the instructor ahead of time.

Final Examination Policy
An examination is held at the end of most courses according to the published examination schedule. Alternate evaluation methods and schedules may be used when recommended by the departmental faculty and approved by the dean of the college offering the course. Any change in time from the published schedule requires the recommendation of the chairperson of the department and approval of the dean of the college offering the course. Any student who would be disadvantaged by such a change should report this in advance to the dean of the college offering the course, who will ensure that satisfactory alternate arrangements will be made by the instructor. Final exams for all courses, on-campus and semester based online, will conclude on or prior to the end of the final exam period. No final exams shall extend beyond the final exam period.

A student who is absent from a regularly scheduled examination without an excuse considered valid by the instructor is normally given an F for the course. If the excuse is valid, the policy on incompletes will apply.

No undergraduate student should be obliged to write three or more finals on the same day. If the student has three or more finals scheduled the same day, the student wishing an accommodation regarding final exams must contact his/her instructors to establish a mutually acceptable time to reschedule one or more of the exams. Any student request for the rescheduled final exam must be presented to the instructor before the end of the tenth week of the semester, otherwise, the student’s rescheduling right is forfeited. If an accommodation cannot be reached, he or she should contact the department chair(s) to find a mutually agreeable time. If no agreement is reached, the appropriate dean(s) should be contacted. The final appeal, if no mutually convenient time has been found, will be to the Vice President of Academic Affairs.

Undergraduate Probation, Suspension and Dismissal Policy
Academic Probation. Students at the University of North Dakota are expected to make progress toward attaining their degrees. Students who have earned fewer than 90 total hours will be considered in Good Academic Standing if they maintain a UND Grade Point Average (GPA) of C (2.00) or higher. Students who have earned 90 or more total hours will be in Good Academic Standing only with a 2.00 or higher GPA on both UND and cumulative hours. Students who do not maintain minimum academic requirements will, at the end of the fall, spring, or summer term in which they fail to meet minimum standards, be placed on Academic Probation. Students on Academic Probation may remove this status by attaining Academic Good Standing. Students will be continued on Academic Probation if they earn at least a 2.00 term GPA at the end of the semester of probation.

Suspension. A student on Academic Probation who earns less than a 2.00 term GPA at the end of the semester of probation is considered not to be making academic progress and will be suspended. A suspended student may apply to return to the University after one semester’s absence. In order to return
to UND, all suspended students must seek reinstatement from the Dean of the college in which they intend to enroll and readmission from the Office of the Registrar. If reinstatement is granted, the student will return to UND on probationary status. In addition, Deans may specify enrollment stipulations at the time of reinstatement. A request for reinstatement after suspension must be made at least 30 days prior to the semester in which the student seeks to return.

Under extenuating circumstances, suspended students may seek immediate reinstatement from the Dean of the college in which they intend to enroll without leaving the University for one academic semester. A request for immediate reinstatement must be made by the Monday, one week prior to the first week of school, of the semester in which the student seeks to return.

If the Dean does not reinstate the student after suspension, (whether a request for immediate reinstatement is made or the student sits out a term) the student may appeal the Dean’s decision. The appeal is requested through the University Senate Student Academic Standards Committee.

In all cases, if requesting reinstatement, suspended students must provide evidence of academic potential and a plan for significant academic success. Students are eligible to request reinstatement from suspension once within the duration of their undergraduate career at the University.

Separate from the request for reinstatement process following suspension, if the student feels the suspension has occurred based on circumstances beyond the student’s control, a request to appeal the suspension may be made. The request for an appeal following suspension must be made within 30 days to the University Senate Student Academic Standards Committee.

Dismissal. After the first suspension, failure to achieve minimum academic standards will result in the student being dismissed from the University. Dismissed students may apply to return to the University after a minimum of one year separation from the Institution along with evidence of academic potential and a plan for significant academic success.

An application for readmission after dismissal must be made at least 30 days prior to the beginning of the semester in which the student seeks to return. The request for readmission is acted upon by the University Senate Student Academic Standards Committee. If readmission is granted, the student will return to UND on probationary status. Students are eligible to request readmission from dismissal once within the duration of their undergraduate career at the University.

Separate from the request for readmission following dismissal, if the student feels the dismissal was as a result beyond the student’s control, a request to appeal the dismissal may be made. The request for an appeal following dismissal must be made within 30 days to the University Senate Student Academic Standards Committee.

Suspension and dismissal are permanently recorded on the student’s transcript. (NOTE: It is possible to be in Good Academic Standing at the University, and, yet not to be in Good Academic Standing in certain University transcript. (NOTE: It is possible to be in Good Academic Standing at the University.)

Scholastic Honesty

Students are expected to maintain scholastic honesty. Scholastic dishonesty includes but is not limited to cheating on a test, plagiarism, and collusion.

1. Cheating on a test includes, but is not restricted to:
   a. Copying from another student’s test.
   b. Possessing or using material during a test not authorized by the person giving the test.
   c. Collaborating with or seeking aid from another student during a test without authority.
   d. Knowingly using, buying, selling, stealing, transporting, or soliciting in whole or in part the contents of an unadministered test.
   e. Substituting for another student or permitting another student to substitute for oneself to take a test.
   f. Bribing another person to obtain an unadministered test or information about an unadministered test.

2. Plagiarism means the appropriation, buying, receiving as a gift, or obtaining by any means another person’s work and the unacknowledged submission or incorporation of it in one’s own work. This includes appropriation of another person’s work by the use of computers or any other electronic means.

3. Collusion means the unauthorized collaboration with another person in preparing written work offered for credit.

Instructors choosing to treat a case of scholastic dishonesty as a scholastic matter have the authority to decide how the incident of dishonesty will affect the student’s grade in the course. If, before the drop date, an instructor is considering such action (or still investigating a possible case of dishonesty), the instructor may, with the concurrence of the dean of the course, place a hold on the student’s registration to prevent the student dropping the course. If the student has already dropped the course, the dean of the course may void that drop and have the Registrar re-enroll the student in the class.

For detailed policy statements and procedures dealing with scholastic dishonesty, see the Code of Student Life, Appendix B-2, Academic Dishonesty.

Academic Honors

President’s Honor Roll

At the end of each semester, a list of undergraduate honor students is published and designated as the President’s Honor Roll. To qualify, a student must have a cumulative UND grade point average of 3.80 or higher. The student must also have earned a minimum of 24 semester hours at UND and have completed a minimum of 12 hours at the close of the semester, eight of which must be for traditional letter grades. The President’s Honor Roll is noted on the student’s official transcript.

Dean’s List

The Dean’s List, published at the end of each semester, contains the names of students who are ranked in the top 15 percent of their college, based on the
grade point average earned by students in UND coursework for the semester. The students must have completed a minimum of 12 semester hours at the close of the semester, eight of which must be for traditional letter grades.

**General Honors**

Candidates for honors with their baccalaureate degree must have earned at least 50 graded hours at UND. Honors will be awarded on the basis of the student’s UND grade point average.

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<thead>
<tr>
<th>Honor</th>
<th>GPA</th>
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<tbody>
<tr>
<td>Cum laude</td>
<td>3.5</td>
</tr>
<tr>
<td>Magna cum laude</td>
<td>3.7</td>
</tr>
<tr>
<td>Summa cum laude</td>
<td>3.9</td>
</tr>
</tbody>
</table>

Honors awards for the commencement ceremony and for publication purposes are made on the basis of UND GPA at the end of the previous semester. Actual honors will be based on the GPA of all completed work at the time the degree is granted.
Undergraduate Programs and Courses

In the menu to the left, is an alphabetical list of undergraduate programs and courses.

The University publishes electronically an official Schedule of Courses before the beginning of each academic term. It lists the class period, building, and room assigned to each course offered that semester or summer session.

Enrollment Restrictions

Enrollment in some University of North Dakota classes is restricted to students who have been admitted into specific major concentrations, who have achieved specific classification status, or who have completed course prerequisites. In some high demand areas, not all students who request a particular course may be admitted in a given semester because of staffing or other University limitations. Generally, the University registers undergraduate students in order of their classification; nevertheless, the University does not guarantee that a student will be able to enroll in a specific course during any given semester. Students must be registered to attend a class session.

Course Numbers

Courses numbered in the 100s are intended primarily for freshmen; in the 200s for sophomores; in the 300s for juniors; in the 400s for seniors and in the 500s for graduates.

The numbers 199, 299, 399 and 499 are reserved for Honors Program Courses.

Credit

Academic units are expressed in terms of semester credit hours at the University of North Dakota. For face-to-face courses, one semester credit hours represents one 50-minute class period (lecture or structured student/faculty interaction) or 2-3 hours of laboratory session for each week of the semester.

For online or distance courses, UND academic units are assigned according to the classification of the distance course:

- Type 1: Distance course sections taught synchronously with face-to-face sections with equivalent student learning objectives and expectations for student effort – The distance section is assigned the same credit hours as the face-to-face section.
- Type 2: Distance course sections taught asynchronously with face-to-face sections with equivalent student learning objectives and expectations for student effort – The distance section is assigned the same credit hours as the face-to-face section.
- Type 3: Distance courses not classified as Type 1 or 2 that share equivalent student learning objectives and expectations for student effort as face-to-face sections of the course at UND – The distance section is assigned the same credit hours as the face-to-face section.
- Type 4: Distance courses not classified as Type 1 or 2 that do not have corresponding face-to-face sections at UND for comparison – The department or unit providing the course must document the expected level of student effort, expected student/faculty interactions, course assessment plan, and student learning objectives for the course. This information will be reviewed by the appropriate Department, College/School, and University curriculum committees for assignment of appropriate credit hours.

Undergraduate Student Classification

- Freshman: 0-23 credits completed
- Sophomore: 24-59 credits completed
- Junior: 60-89 credits completed
- Senior: 90+ credits

Frequency of Offerings

The following symbols at the end of the course description indicate when and how often a class is usually available for registration.

- F  usually every Fall semester
- S  usually every Spring semester
- SS usually every Summer session
- F/2 usually every other Fall semester
- S/2 usually every other Spring semester

Accountancy (Acct)

Bachelor of Accountancy (p. 27)

B.B.A. with Major in Managerial Finance and Accounting (p. 28)

Courses

ACCT 160. Intro to Accounting Careers. 1-3 Credits.
An introduction to accounting careers and the accounting profession. Students develop skills and resources that will help them launch a career in accounting. Prerequisite or Corequisite: ACCT 200 or declared or pre accountancy major or consent of CoBPA academic advisor. F.S.

ACCT 200. Elements of Accounting I. 3 Credits.
Basic principles of the complete accounting cycle. F.S.

ACCT 201. Elements of Accounting II. 3 Credits.
Special emphasis on partnership, corporate accounting, and the uses of accounting information by managers. Prerequisite: ACCT 200 or ACCT 275. F.S.

ACCT 218. Advanced Spreadsheet Applications. 3 Credits.
Advanced techniques in computer spreadsheet applications. Prerequisite: ISBC 117 or ISBC 217. Prerequisite or Corequisite: ACCT 201. F.S.

ACCT 275. Accounting for Pre-MBA. 3 Credits.
No credit allowed to students who have completed ACCT 201. Financial and managerial accounting concepts and practices oriented towards the decision maker. F.S.

ACCT 301. Intermediate Accounting I. 3 Credits.
Concepts, time value of money, current assets, current liabilities, plant and equipment, and intangibles. Prerequisite: ACCT 201. Prerequisite or Corequisite: ACCT 218. F.S.

ACCT 302. Intermediate Accounting II. 3 Credits.
Corporations, long-term liabilities, investments, statement analysis, and cash flow statement. Prerequisites: ACCT 301 with a grade of “C” or better or permission of the Department Chair and Junior or Senior Standing; declared CoBPA majors only. F.S.

ACCT 309. Accounting Information Systems. 3 Credits.
The application of systems design and use from the accountant’s perspective. Coverage includes computerized and manual accounting systems, elements of internal control, flowcharting, and the interface of accounting and management information systems. Prerequisites: ACCT 301 and Junior or Senior Standing; declared CoBPA majors only. F.S.

ACCT 312. Fund Accounting. 3 Credits.
Financial accounting, control, and reporting for governmental and not-for profit entities. Prerequisites: ACCT 201 and ACCT 218; Junior or Senior Standing; declared CoBPA majors only. F.S.

ACCT 315. Business Law I. 3 Credits.
The legal environment of business, governmental regulation, contracts, and property. Prerequisite: Sophomore, Junior or Senior Standing. F.S.

ACCT 316. Business Law II. 3 Credits.
Commercial paper, secured transactions, business organizations, and liability of professionals. Prerequisites: ACCT 315; Junior or Senior Standing; declared CoBPA majors only. F.S.

ACCT 320. Cost Accounting. 3 Credits.
Principles and techniques used to account for and analyze costs incurred to produce products or services. Prerequisite: ACCT 201. Prerequisite or Corequisite: ACCT 218. F.S.
ACCT 380. International Accounting. 3 Credits.
Topics include comparative accounting systems, environmental influences on accounting, international financial statement analysis, foreign currency transactions, international standards harmonization, international taxation, transfer pricing, and multinational performance evaluation. Prerequisites: ACCT 201; Junior or Senior Standing; declared CoBPA majors only. S.

ACCT 397. Cooperative Education. 1-2 Credits.
Compensated work experience in various areas of accounting. Enrollment in 1 credit grants half-time status, 2 credits grants full-time status (See catalog description of Cooperative Education.) Repeatable to 12 credits cumulative from ACCT 397, ACCT 497, ACCT 597. Prerequisites: ACCT 201, minimum GPA of 2.50, and approval of the Accounting Co-operative/Internship Coordinator. Repeatable to 12 credits. S/U grading. F.S.SS.

ACCT 401. Advanced Accounting. 3 Credits.
Special problems in accounting including consolidated statements, partnerships, and foreign exchange. Prerequisites: ACCT 302; Junior or Senior Standing; declared CoBPA majors only. F.S.

ACCT 403. Contemporary Accounting Theory. 3 Credits.
A study of the emerging issues and the problems facing the accounting profession with special emphasis on the authoritative pronouncements as designated by the American Institute of CPAs and the Financial Accounting Standards Board. S-U grading not allowed. Prerequisite or Corequisite: ACCT 401 or consent of instructor; declared CoBPA majors only. F.S.

ACCT 405. Assurance Services. 3 Credits.
Explores methods of improving the quality of information or its context for decision makers. Examples include assurances on the reliability of financial statements, the processes and controls used to manage and operate businesses, assertions and agreements made to third parties, and regulatory compliance. Prerequisites: ACCT 302, ACCT 309, ECON 210; Junior or Senior Standing; declared CoBPA majors only. F.S.

ACCT 406. Independent Assurance. 3 Credits.
Auditing and assurance theory as applied by independent accountants. Prerequisites: ACCT 405 or consent of instructor; declared CoBPA majors only. S.

ACCT 410. Federal Individual Income Tax. 3 Credits.
Federal income tax relating to individuals to include the more complex tax situations. A computerized individual income tax preparation is used as a part of the course. Prerequisites: ACCT 201; Junior or Senior Standing; declared CoBPA majors only. F.S.

ACCT 411. Business Income Taxation. 3 Credits.
Federal income tax relating to corporations and partnerships. Introduction to estate and gift tax and fiduciary income tax. Prerequisites: ACCT 302; Senior Standing; declared CoBPA majors only. F.S.

ACCT 412. Advanced Tax. 3 Credits.
Unified transfer tax, trusts and estates, other contemporary topics as appropriate, and techniques of tax research. Prerequisites: Consent of the instructor, open to declared CoBPA majors only. S.

ACCT 416. Business Law for Accountants. 3 Credits.
Both foundational and advanced topics in business law relevant for the practice of public accountancy including agency law, contracts, negotiable instruments, ethics, legal representation in business, and the impact of selected governmental regulations on businesses. Prerequisites: Declared CoBPA majors or students admitted to the Master of Accountancy program, only. F.S.SS.

ACCT 450. Contemporary Issues in Accounting. 3 Credits.
A critical analysis of contemporary issues in accounting. Written and oral presentations are required. Prerequisites: ACCT 302; Senior Standing; declared CoBPA majors only. Prerequisite or Corequisite: ACCT 405. S.

ACCT 494. The Literature of Accounting. 1-3 Credits.
Directed studies in the recognized journals, periodicals, and professional publications of the field. Prerequisites: Consent of the instructor, open to declared CoBPA majors only. Repeatable to 6 credits.

ACCT 495. Special Topics in Accounting. 1-3 Credits.
Specially arranged courses/seminars. Topics will vary. Courses will offer specialized knowledge in a specific area related to accounting. Prerequisites: Minimum of junior standing and approval of the instructor or department chair. Repeatable to 12 credits. On demand.

ACCT 497. Accounting Internship. 1-6 Credits.
Compensated work experience in various areas of accounting. Repeatable to 12 credits cumulative from ACCT 397, ACCT 497, ACCT 597. Prerequisites: ACCT 201; minimum GPA of 2.50; approval of the Accounting Co-operative/Internship Coordinator. Repeatable to 12 credits. S/U grading. F.S.SS.

Bachelor of Accountancy

Required 120 credit hours (36 of which must be numbered 300 or above) including:

I. Essential Studies Requirements (see University ES listing).

II. Choose one of the following: MATH 103, MATH 146, or MATH 165

III. College of Business and Public Administration Requirements:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
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<tbody>
<tr>
<td>ACCT 200</td>
<td>Elements of Accounting I</td>
</tr>
<tr>
<td>ACCT 201</td>
<td>Elements of Accounting II</td>
</tr>
<tr>
<td>ECON 201</td>
<td>Principles of Microeconomics</td>
</tr>
<tr>
<td>ECON 202</td>
<td>Principles of Macroeconomics</td>
</tr>
<tr>
<td>ECON 210</td>
<td>Introduction to Business and Economic Statistics</td>
</tr>
<tr>
<td>ISBC 217</td>
<td>Fundamentals of Computer Information Systems</td>
</tr>
<tr>
<td>FIN 310</td>
<td>Principles of Financial Management</td>
</tr>
<tr>
<td>MGMT 300</td>
<td>Principles of Management</td>
</tr>
<tr>
<td>MGMT 301</td>
<td>Operations Management</td>
</tr>
<tr>
<td>MRKT 305</td>
<td>Marketing Foundations</td>
</tr>
<tr>
<td>MGMT 475</td>
<td>Strategic Management</td>
</tr>
</tbody>
</table>

Total Credits: 33

IV. Major Requirements:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 218</td>
<td>Advanced Spreadsheet Applications</td>
</tr>
<tr>
<td>ACCT 301</td>
<td>Intermediate Accounting I</td>
</tr>
<tr>
<td>ACCT 302</td>
<td>Intermediate Accounting II</td>
</tr>
<tr>
<td>ACCT 309</td>
<td>Accounting Information Systems</td>
</tr>
<tr>
<td>ACCT 320</td>
<td>Cost Accounting</td>
</tr>
<tr>
<td>ACCT 405</td>
<td>Assurance Services</td>
</tr>
<tr>
<td>ACCT 411</td>
<td>Business Income Taxation</td>
</tr>
<tr>
<td>ACCT 416</td>
<td>Business Law for Accountants</td>
</tr>
</tbody>
</table>

Select two of the following: 6

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 312</td>
<td>Fund Accounting</td>
</tr>
<tr>
<td>ACCT 316</td>
<td>Business Law II</td>
</tr>
<tr>
<td>ACCT 401</td>
<td>Advanced Accounting</td>
</tr>
<tr>
<td>ACCT 403</td>
<td>Contemporary Accounting Theory</td>
</tr>
<tr>
<td>ACCT 406</td>
<td>Independent Assurance</td>
</tr>
<tr>
<td>ACCT 410</td>
<td>Federal Individual Income Tax</td>
</tr>
<tr>
<td>ACCT 412</td>
<td>Advanced Tax</td>
</tr>
<tr>
<td>ACCT 450</td>
<td>Contemporary Issues in Accounting</td>
</tr>
<tr>
<td>ACCT 494</td>
<td>The Literature of Accounting</td>
</tr>
<tr>
<td>ACCT 497</td>
<td>Accounting Internship</td>
</tr>
</tbody>
</table>

Total Credits: 30

V. College of Business & Public Administration Graduation Requirements:

1. Earn a minimum cumulative GPA of 2.50
2. Earn a minimum UND GPA of 2.50
3. Earn a minimum cumulative major GPA of 2.50 (business administration courses that apply toward the degree and major)
4. Earn a minimum UND major GPA of 2.50 (business administration courses that apply toward the degree and major)
5. At least half of the business courses that apply toward the degree and major must be from UND

Please note: Graduation with 120 credits does NOT satisfy all eligibility requirements for taking the CPA exam (150 credit hours are required)! Students interested in pursuing the CPA certification are encouraged...
Bachelor of Business Administration with Major in Information Systems

Required 120 credit hours (36 of which must be numbered 300 or above) including:

I. Essential Studies Requirements (see University ES listing).

II. Choose one of the following: MATH 103, MATH 146, or MATH 165

III. College of Business and Public Administration requirements:

ACCT 200      Elements of Accounting I                    3
ACCT 201      Elements of Accounting II                   3
ECON 201      Principles of Microeconomics                 3
ECON 202      Principles of Macroeconomics                  3
ECON 210      Introduction to Business and Economic Statistics 3
ISBC 217      Fundamentals of Computer Information Systems  3
FIN 310      Principles of Financial Management             3
MGMT 300      Principles of Management                      3
MGMT 301      Operations Management                        3
MRKT 305      Marketing Foundations                       3
MGMT 475      Strategic Management                        3

Total Credits 33

IV. Major Requirements:

ISBC 300      Programming for Data Analytics                 3
ISBC 330      Database Management                            3
ISBC 340      Fundamentals of Networking                      3
ISBC 370      Web Development                                  3
ISBC 410      Information Security                          3
ISBC 430      Database Analytics                             3

6 Credits of Electives selected from:

ISBC 305      End-User Applications or ACCT 218 Advanced Spreadsheet Applications

ACCT 309      Accounting Information Systems

Any other Information Systems course at 300 level or higher

Total Credits 24

V. College of Business & Public Administration Graduation Requirements:

1. Earn a minimum cumulative GPA of 2.50
2. Earn a minimum UND GPA of 2.50
3. Earn a minimum cumulative major GPA of 2.50 (business administration courses that apply toward the degree and major)
4. Earn a minimum UND major GPA of 2.50 (business administration courses that apply toward the degree and major)
5. At least half of the business courses that apply toward the degree and major must be from UND

Bachelor of Business Administration with Major in Managerial Finance and Accounting

Required 120 credits (36 of which must be numbered 300 or above) including:

I. Essential Studies Requirements (see University ES listing).

II. College of Business and Public Administration Requirements (see BPA College listing) and including:

ACCT 200      Elements of Accounting I                    6
& ACCT 201 and Elements of Accounting II
ACCT 315      Business Law I                               3
ISBC 117      Personal Productivity with Information Technology 1
ISBC 217      Fundamentals of Computer Information Systems  3
ECON 201      Principles of Microeconomics                 3
ECON 202      Principles of Macroeconomics                  3
ECON 210      Introduction to Business and Economic Statistics 3
ECON 303      Money and Banking                             3
MATH 103      College Algebra                               3
MATH 146      Applied Calculus I                            3
MGMT 300      Principles of Management                      3
MGMT 301      Operations Management                        3
FIN 310      Principles of Financial Management             3
MGMT 475      Strategic Management                        3
MRKT 305      Marketing Foundations                       3
POLS 115      American Government I                        3
COMM 110      Fundamentals of Public Speaking               3

Select one of the following:

PSYC 111      Introduction to Psychology
SOC 110      Introduction to Sociology
ANTH 171      Introduction to Cultural Anthropology

Total Credits 55

III. The following Major Requirements:

ACCT 218      Advanced Spreadsheet Applications             3
ACCT 301      Intermediate Accounting I                    6
& ACCT 302 and Intermediate Accounting II
ACCT 309      Accounting Information Systems               3
ACCT 320      Cost Accounting                                3
FIN 340      Intermediate Financial Management              3
FIN 350      Financial Statement Analysis                    3
FIN 360      Capital Market Financing and Investment Strategies 3
FIN 475      Cases in Managerial Finance                     3

At least three upper-division courses from Accountancy or Finance

Total Credits 9

Minor in Information Systems

21 credit hours, including:

ISBC 300      Programming for Data Analytics                 3
ISBC 330      Database Management                            3
ISBC 410      Information Security                          3
ISBC 430      Database Analytics                             3

Electives selected from:

ISBC 217      Fundamentals of Computer Information Systems
ISBC 305      End-User Applications or ACCT 218 Advanced Spreadsheet Applications
Aerospace Studies (AS)

Courses

AS 110. Air Force ROTC Fitness. 1 Credit. Introduction to various AFROTC team sports. Promotes benefits of being physically fit and maintaining Air Force fitness standards. Repeatable. Repeatable. F.S.

AS 111. Heritage and Values of the United States Air Force I. 1 Credit. Survey course designed to introduce students to the United States Air Force and provides an overview of the basic characteristics, missions, and organization of the Air Force. Corequisite: AS 210. F.

AS 112. Heritage and Values of the United States Air Force II. 1 Credit. Continuation of AS 111. Provides an overview of the basic characteristics, missions, and organization of the Air Force. Corequisite: AS 210 or AS 410. S.


AS 211. Team and Leadership Fundamentals I. 1 Credit. Focuses on laying the foundation for teams and leadership. The topics include skills that will allow cadets to improve their leadership on a personal level and within a team. The courses will prepare cadets for their field training experience where they will be able to put the concepts learned into practice. The purpose is to instill a leadership mindset and motivate sophomore students to transition from AFROTC cadet to AFROTC officer candidate. Corequisite: AS 210. F.

AS 212. Team and Leadership Fundamentals II. 1 Credit. Continuation of AS 211. Focuses on laying the foundation for teams and leadership. The topics include skills that will allow cadets to improve their leadership on a personal level and within a team. The courses will prepare cadets for their field training experience where they will be able to put the concepts learned into practice. The purpose is to instill a leadership mindset and to motivate sophomore students to transition from AFROTC cadet to AFROTC officer candidate. Corequisite: AS 210. S.

AS 321. Leading People and Effective Communication I. 3 Credits. Teaches cadets advanced skills and knowledge in management and leadership. Special emphasis is placed on enhancing leadership skills and communication. Cadets have an opportunity to try out these leadership and management techniques in a supervised environment as juniors and seniors. Corequisite: AS 410. F.

AS 322. Leading People and Effective Communication II. 3 Credits. Continuation of AS 321. Teaches cadets advanced skills and knowledge in management and leadership. Special emphasis is placed on enhancing leadership skills and communication. Cadets have an opportunity to try out these leadership and management techniques in a supervised environment as juniors and seniors. Corequisite: AS 410. S.

AS 410. Leadership Laboratory. 1 Credit. Development of leadership skills in a practical, supervised laboratory. Students must instruct, supervise, and lead junior cadets participating in AS 210, and perform high level management functions within the cadet corps organization. Repeatable. Repeatable. S/U grading. F.S.

AS 441. National Security Affairs/Preparation for Active Duty I. 3 Credits. Designed for college seniors and gives them the foundation to understand their role as military officers in American society. It is an overview of the complex social and political issues facing the military profession and requires a measure of sophistication commensurate with the senior college level. Corequisite: AS 410. F.

AS 442. National Security Affairs/Preparation for Active Duty II. 3 Credits. A continuation of AS 441. Continued application of the complex social and political issues facing the military profession and will provide information that will prepare the cadets for Active Duty. Corequisite: AS 410. S.

Aerospace Studies

UND students may participate in the Air Force Reserve Officer Training Corps program through an agreement between UND, North Dakota State University and the Air Force. The purpose of this program is to enable qualified students (undergraduate and graduate) to become commissioned officers in the United States Air Force. Upon completion of the program and graduation from UND, students are commissioned as second lieutenants in the United States Air Force.

The program is conducted by North Dakota State University faculty on the UND campus. Students interested in participating in the program should contact: Air Force ROTC Detachment 610, 255 Centennial Drive, Armory Building, Room 2, Stop 8360, University of North Dakota, Grand Forks ND 58202, (701) 777-0437.

The program is conducted in two phases: the General Military Course for first year students and sophomores, and the Professional Officer Course for juniors and seniors. Each student must register for the appropriate leadership laboratory course (AS 210 Leadership Laboratory for freshman and sophomore or AS 410 Leadership Laboratory for juniors and seniors) during each term. Students must complete a field training course before entry into the Professional Officer Course.

General Military Course (GMC)

The four-year program begins with the General Military Course.

Field Training

Air Force ROTC Field Training is offered during the summer months at Maxwell AFB, Alabama. Students in the four-year program participate in four weeks of field training during the semester after their sophomore year.

The major areas of study in the four-week field training program include junior officer training, aircraft and aircrew indoctrination, survival training, base functions, the Air Force environment, and physical training.

Leadership Laboratory

(AS 210 Leadership Laboratory, 1 credit and AS 410 Leadership Laboratory, 1 credit; repeatable). Instruction is conducted within the framework of a cadet organization and includes a progression of experiences designed to develop each student’s leadership potential. Leadership laboratory involves a study of Air Force customs and courtesies, drill and ceremonies, career opportunities in the Air Force, and the life and work of an Air Force junior officer. Students develop their leadership potential in a practical and supervised laboratory, which can include field trips to Air Force installations throughout the United States.

AS 210 Leadership Laboratory is a corequisite of:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AS 111</td>
<td>Heritage and Values of the United States Air Force I</td>
<td>1</td>
</tr>
<tr>
<td>AS 112</td>
<td>Heritage and Values of the United States Air Force II</td>
<td>1</td>
</tr>
<tr>
<td>AS 211</td>
<td>Team and Leadership Fundamentals I</td>
<td>1</td>
</tr>
<tr>
<td>AS 212</td>
<td>Team and Leadership Fundamentals II</td>
<td>1</td>
</tr>
<tr>
<td>AS 410</td>
<td>Leadership Laboratory</td>
<td>1</td>
</tr>
</tbody>
</table>

AS 410 Leadership Laboratory is a corequisite of:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AS 321</td>
<td>Leading People and Effective Communication I</td>
<td>3</td>
</tr>
<tr>
<td>AS 322</td>
<td>Leading People and Effective Communication II</td>
<td>3</td>
</tr>
</tbody>
</table>
Professional Officer Course (POC)

The Professional Officer course (below) taken during the student's junior and senior years, concentrates on four main themes: communication skills, national security studies, and the principles and practices of management and leadership in the U.S. Air Force.

American Indian Studies (IS)

B.A. in American Indian Studies (p. 31)
Minor in American Indian Studies (p. 32)

Courses

IS 121. Introduction to American Indian Studies. 3 Credits.
Introduction to main concepts, methods, and theories in American Indian Studies, designed to provide a background for further studies. This course approaches American Indian Studies from a perspective grounded in the humanities. F,S,SS.

IS 122. American Indians and Tradition. 3 Credits.
This course provides an introduction to the American Indian experience, as well as to methodological concepts of American Indian Studies. It places emphasis both on understanding how American Indians fit into various representations of the past and on how American Indians have used and continue to use the past to shape their own identities. F,S,SS.

IS 123. American Indians and Culture. 3 Credits.
This course provides an introduction to the American Indian experience, as well as to methodological concepts of American Indian Studies. It places an emphasis on understanding Native cultures and the challenges they are facing, exploring contemporary issues and Native communities in their cultural contexts. F,S,SS.

IS 151. Popular Culture and American Indians. 3 Credits.
European settlers had firm notions of what tribal peoples on the American continent were like before even leaving Europe. This course will show how these stereotypes and ethnocentrism were perpetuated in various genres and fields, e.g. captivity tales, fiction, film, advertisements, and social media. Finally, students will analyze some recent examples of these stereotypes and ethnocentrism in print and film. SS.

IS 171. Hollywood Indians. 3 Credits.
A summer class exploring the portrayal and roles of American Indians in feature films from the early 20th century to the early 21st century, and what we can learn from these films. SS.

IS 181. Native North America to 1600. 3 Credits.
This course introduces students to thinking historically about North America's pre-Columbian and early Columbian pasts and the relationship between the two both topically and methodologically. This will require students to consider the various sources and methods of anthropology and history while trying to understand the continuities and discontinuities that link the experiences of Native Americans before and after the arrival of Europeans and Africans. It will introduce students to close reading, research skills, college writing, and participatory classroom experiences. S.

IS 200. American Indians in a Multicultural Context. 3 Credits.
This course provides an introduction to multicultural and diversity issues, focusing primarily on the United States and with an emphasis on American Indian societies. It explores common experiences of Native and other minority groups, and discusses the integration of these ethnicities in a globalized world. F,S.

IS 201. History of the Sioux. 3 Credits.
This course explores the history of the Siouan speakers, predominantly the Dakota and Lakota nations, from their origins to today. It focuses primarily on the last two hundred years. The course gives a timeline for this history, explores the context of events, and discusses appropriate methodologies. S.

IS 202. Cultures of the Sioux. 3 Credits.
This class introduces the cultures of the Siouan speakers, predominantly the Lakota and Dakota nations, since the 19th century. The course addresses social organization, economies, religion, kinship, diplomacy, and the reasons, motivations, and consequences for cultural change. S.

IS 203. History of the Ojibwe. 3 Credits.
This course explores the history of the Anishinabe, predominantly the Chippewa or Ojibwe nations, from their origins to today. It focuses primarily on the last two hundred years. The course gives a timeline for this history, explores the context of events, and addresses some cultural issues. F.

IS 204. Cultures of the Ojibwe. 3 Credits.
This class introduces the cultures of the Anishinabe, predominantly the Chippewa or Ojibwe nations, since the 19th century. The course addresses social organization, economies, religion, kinship, diplomacy, and the reasons, motivations, and consequences for cultural change. On demand.

IS 207. History of the Three Affiliated Tribes. 3 Credits.
This course explores the history of the Mandan, Hidatsa, and Arikara nations, from their origins to today. It focuses primarily on the last two hundred years. The course gives a timeline for this history, explores the context of events, and discusses appropriate methodologies. S.

IS 208. Cultures of the Three Affiliated Tribes. 3 Credits.
This class introduces the cultures of the Mandan, Hidatsa, and Arikara nations since the 19th century. The course addresses social organization, economies, religion, kinship, diplomacy, and the reasons, motivations, and consequences for cultural change. S.

IS 221. North American Indians before 1815. 3 Credits.
This is a survey of the history of Native North America to 1815 that will study the diverse experiences of American Indians from arrival of Europeans until 1815. Topics that will be addressed include the development of cultural traditions, Indian responses to colonialism, and Indian influences on the emergence of Euroamerican communities in North America. F.

IS 222. North American Indians since 1815. 3 Credits.
This is an introductory survey of the history of Native North America since 1815. It will study the diverse experiences of American Indians since the era of Removal. Topics that will be addressed include the development of the reservation system, Western expansion and the Indians of the Trans-Mississippi West, and persistence and adaptation in the Twentieth Century. S.

IS 230. Approaches to Native Cultures. 3 Credits.
This course provides students with the background to an understanding of how Native cultures can be approached - how cultures have been and should be studied, described, conceptualized, invented, and imagined. The course focuses on North America, but might involve examples from other regions. F.

IS 240. Research and Writing in Indian Studies. 3 Credits.
The course will introduce students to professional writing in Indian Studies. The final goal is for students to turn out a 20-25 page research paper in an area of interest to them. S.

IS 250. Lakota Language I. 3 Credits.
This is the first of two Lakota language classes for beginning speakers. On demand.

IS 251. Lakota Language II. 3 Credits.
This is the second of two Lakota language classes for beginning speakers. Prerequisites: IS 250 or permission. On demand.

IS 311. Health and American Indian Cultures. 3 Credits.
The course investigates cultural perceptions of health as well as specific historic and contemporary health problems in indigenous communities in Canada and the United States. F.

IS 320. Native Cultural Landscapes. 3 Credits.
This course engages the notion of landscape - the environment as made meaningful by cultural perspectives on interactions and responsibilities. It investigates how American Indian cultures create, imagine, construct, map, and interact with landscapes and how they render them meaningful. F.
IS 344. Education and American Indians. 3 Credits.
Throughout the centuries of American Indian and white contact, American Indian education advocated by the colonial and federal governments as well as by various denominations has reflected the changing attitudes, stereotypes, and ethnocentrism of Europeans and Euroamericans toward American Indian peoples. This course will examine the changing policies of the federal government, the attitudes of the various denominations, and some of the contemporary changes in the educational system. S.

IS 346. Gender in American Indian Cultures. 3 Credits.
This class will look at the ways American Indian cultures define various genders and their roles and contributions in historical and contemporary times. S.

IS 348. Beyond the Reservation. 3 Credits.
This is an advanced course that introduces students to the scholarship on American Indians living and working in places beyond their traditional communities. The course will look at issues such as work and labor, urban Indian communities, pan-Indian identities, and contributions to American institutions and public life. S.

IS 350. Native American Languages. 3 Credits.
This course provides an overview of Native American languages, the connection of culture to language, an introduction to socio-linguistics, and other discussions of language structure and linguistics as they pertain to Native North America. F.

IS 352. Native Philosophies and Religions. 3 Credits.
Introduces students to the complex and rich religions of Native Americans, from traditional religions to the Native American Church and the American Indian Religious Freedom Act. Both traditional and contemporary belief systems are discussed. F.

IS 354. Dynamics of Conquest and Resistance. 3 Credits.
This course is an advanced course on the experiences of Indian peoples in colonial Latin America and to the historical methods used to study them. The course will cover the period from late pre-Columbian times through Latin American Independence and will address topics including the conquest of core Indian civilizations, the creation of colonial Indian identities in the republica de Indios, the persistence of Indios barbaros on the frontiers, and the meaning of Latin American independence for Indians. F.

IS 356. Law, Culture, and Communities. 3 Credits.
This course explores in what ways laws impact indigenous communities, and how different communities use, construct, and perceive laws. It explores the cultural construction and meaning of law through its implementation in and on Native communities. F.

IS 358. American Indians and Sovereignty. 3 Credits.
This course is an historical inquiry into the colonial imposition of sovereignty onto Native America and the resulting American Indian tribal claims to sovereignty and the concomitant development of "Indian law" within the legal frameworks of modern North American nation states (Canada, United States, and Mexico). It will examine the initial colonial encounters between indigenous and imperial legal cultures, the 19th century United States policies and judicial findings that established precedents for continued Indian sovereignty, and the expansion of those precedents and how over the course of the 20th century Indian nations have used these to establish federally recognized tribal governments and established the place of "Indian common law" as the law in Indian country. We will also look at how issues of sovereignty impact issues such as gaming, natural resource management, and economic development. S, even years.

IS 360. Oral Traditions in American Indian Cultures. 3 Credits.
Despite all predictions that they would disappear, American Indian oral traditions are as strong today as ever before. This course will introduce students to the complexities, richness, and conventions of different oral traditions as well as to the collecting process. F.

IS 362. Resource Extraction and Indigenous Peoples. 3 Credits.
This course takes a critical look at the impacts of resource extraction and its consequences on indigenous peoples and their communities, how indigenous peoples have participated in and resisted resource extraction, and at the economic, ecological, political, and cultural consequences of resource extraction. S, odd years.

IS 379. Special Topics. 1-3 Credits.
Topics and credits will vary with availability of staff, and with student interests. Repeatable when topics vary. Repeatable.

IS 385. Sustainable Communities. 3 Credits.
This course discusses how societies can build sustainable communities, focusing on indigenous communities in North America and through comparison around the globe. F.

IS 395. Ethnohistory of North America. 3 Credits.
This course introduces students to the historical study of Indian peoples of North America during the colonial and early national periods, particularly in situations where their voices or perspectives are not easily or explicitly captured in historical documentation of their own making. It will focus on key historiographic issues concerning the nature of frontiers and Indian agency as well as on historical method.

IS 410. Indigenous Identities. 3 Credits.
This course looks at issues of indigenous identity: how do people define themselves and others, and what criteria do they use to construct, invent, and imagine their identities? The course focuses on North America, but also looks at global indigenous identities. S.

IS 430. Internship in American Indian Studies. 3 Credits.
Internships provide the opportunity for students to have a meaningful experience related to their field of interest within Indian Studies. Internship placements are with Native American related public or private sector sponsors such as tribal programs, businesses including tribal businesses on a reservation, and various state or private agencies serving Indian populations and causes. Individual learning agreements approved by the Indian Studies faculty and sponsoring supervisors specify student goals, objectives, and methods of assessment. It is expected that students will be of service to the sponsor. Internships may be paid. Prerequisites: Upperclass standing and instructor permission. F,S,SS.

IS 492. Directed Readings in American Indian Studies. 1-3 Credits.
Under the direction of American Indian Studies faculty, students will select readings in subjects not covered in sufficient detail in other American Indian Studies classes. IS 492 and IS 494 combined may be taken for a maximum of 9 credits; must be taken from at least two different faculty if above 6 credits. Prerequisites: Upperclass standing and consent of instructor. Repeatable to 9 credits. F,S,SS.

IS 494. Independent Study in American Indian Studies. 1-3 Credits.
Under the direction of American Indian Studies faculty, students will engage in independent research projects in American Indian Studies subjects. IS 492 and IS 494 combined may be taken for a maximum of 9 credits; must be taken from at least two different faculty if above 6 credits. Prerequisites: Upperclass standing and instructor permission. Repeatable to 9 credits. F,S,SS.

Bachelor of Arts in American Indian Studies

Required 120 credits (36 of which must be numbered 300 or above, and 30 of which must be from UND) including:

I. Essential Studies Requirements (see University ES listing).

II. The Following Curriculum:

A. 36 credit hours in the Major

Of these, the following courses are required:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IS 230</td>
<td>Approaches to Native Cultures</td>
<td>3</td>
</tr>
<tr>
<td>IS 240</td>
<td>Research and Writing in Indian Studies</td>
<td>3</td>
</tr>
<tr>
<td>IS 395</td>
<td>Ethnohistory of North America</td>
<td>3</td>
</tr>
<tr>
<td>or IS 354</td>
<td>Dynamics of Conquest and Resistance</td>
<td>3</td>
</tr>
<tr>
<td>IS 410</td>
<td>Indigenous Identities</td>
<td>3</td>
</tr>
<tr>
<td>Electives from the American Indian Studies curriculum in accordance with advisor recommendations</td>
<td>24 credits</td>
<td></td>
</tr>
</tbody>
</table>

The maximum combined credit hours counting toward the accumulation of credits for the major in IS 430, 492, and 494 is nine. Any student taking more than a combined six credit hours in IS 430, IS 492, and IS 494 has to take these courses from at least two different faculty members.

Only one course from each of the following pairs will count toward the accumulation of credits for the major:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>IS 122</td>
<td>American Indians and Tradition</td>
</tr>
<tr>
<td>or IS 123</td>
<td>American Indians and Culture</td>
</tr>
</tbody>
</table>
**Minor in American Indian Studies**

21 credit hours in American Indian Studies, at least 12 of which are 300-level or above.

The maximum combined credit hours taken from any one instructor to be counted towards the minor is twelve; to fulfill the requirements of the minor, a student has to take courses from at least three different instructors.

**Anatomy and Cell Biology (Anat)**

**Courses**

**ANAT 204. Anatomy for Paramedical Personnel. 3 Credits.**
Two lectures per week presenting a system-based study of human gross anatomy. Prerequisite: Must have 12 or more credits. F.S.

**ANAT 204L. Anatomy for Paramedical Personnel Laboratory. 2 Credits.**
Laboratory exploration of human gross anatomy to complement Anatomy 204. Prerequisite or Corequisite: ANAT 204. F.S.

**Anthropology (Anth)**

**B.A. in Anthropology (p. 33)**

Minor in Anthropology (p. 34)

**Courses**

**ANTH 100. Introduction to Anthropology. 3 Credits.**
An introduction to the breadth of inquiry pursued by anthropologists, including the origins and biological evolution of humans, the prehistoric development of world cultures, and the interplay of biological, social, and cultural factors in present day societies. On demand.

**ANTH 170. Introduction to Biological Anthropology. 3 Credits.**
An introduction to the field of biological or physical anthropology. This course will provide a general background in human evolutionary biology. F.S.

**ANTH 171. Introduction to Cultural Anthropology. 3 Credits.**
Examination of diversity and similarities across contemporary world societies. Topics: fieldwork and ethnographic description; theoretical approaches; communication/human language; interrelationships between environment, technology, social and political organization and worldview; sociocultural change; applied anthropology. Films and case studies illustrate intricacies of culture and how an anthropological perspective provides insights about our own society/culture. F.S.

**ANTH 172. Introduction to Archaeology. 3 Credits.**
This course looks at how we investigate past cultures using the artifacts that people have left behind. What questions do archaeologists ask about the past? How do archaeologists find and record archaeological sites? What field and laboratory techniques are used to collect evidence and gather data, and how do these methods work? How do we interpret and understand the past using archaeological hypotheses, explanations, models and theories? Case studies will be drawn from different regions, cultures, and time periods to illustrate course concepts. F.S.

**ANTH 200. World Prehistory. 3 Credits.**
In this course we explore the extraordinary five million year-long record of human cultural achievements, as reconstructed by scientific archaeology. We will focus on prehistoric societies (those that existed before the advent of writing and written history), on what happened in the past, and how the major milestones in the development of world cultures came about. These milestones include the cultural evolution of our earliest hominin ancestors from almost 5 million years ago, the two million year-long persistence of the hunting and gathering lifeway, the origins of agriculture and farming societies, and the rise and collapse of prehistoric civilizations. F.S.

**ANTH 209. Special Topics. 1-4 Credits.**
Repeatable when topics vary. Repeatable. F.S.

**ANTH 270. Introduction to Forensic Anthropology. 3 Credits.**
Forensic anthropology is the study of skeletal remains in a medico-legal context for the purpose of identification and trauma analysis. This course covers the history of this field, its relevance to death investigation in the United States, and the theories and techniques applied to skeletal identification. On demand.

**ANTH 300. Archaeological Laboratory Methods. 3 Credits.**
A hands-on introduction to the basic processing, organizing, and analytical techniques used in the archaeological laboratory. Excavated materials from prehistoric sites will be used for lab exercises and demonstrations. Includes lecture and lab. Prerequisites: ANTH 172 and permission of instructor. S.

**ANTH 309. Special Topics. 1-4 Credits.**
Repeatable when topics vary. Repeatable. F.S.

**ANTH 325. Human Origins. 3 Credits.**
A description of the fossil evidence for primate and human evolution with an emphasis on the origins and evolution of the hominid and human lines. Prerequisite: ANTH 170 or consent of instructor. On demand.

**ANTH 330. Human Variation. 3 Credits.**
An examination of the range of human physical variation, with a special emphasis on its adaptive nature. Prerequisite: ANTH 170 or consent of instructor. On demand.

**ANTH 335. Primates. 3 Credits.**
A survey of the behavior and life of the living primates, with a special emphasis on similarities and differences to humans. On demand.

**ANTH 340. Medical Anthropology. 3 Credits.**
An examination of the human biological and cultural responses to health and disease as seen from an anthropological perspective. F.

**ANTH 350. Ethnographic Methods. 3 Credits.**
Introduction to fieldwork methods and analytic approaches used by cultural anthropologists in their ethnographic research; class discussion topics will include ethical issues, framing of research problems, the writing of ethnographic accounts, and modes of presentation of research results. Prerequisite: ANTH 171 or by special permission. On demand.

**ANTH 360. Environmental Change & Culture. 3 Credits.**
This course uses an anthropological lens to understand how humans have responded to and/or caused environmental changes and how differing cultural values and behaviors have shaped this relationship. By the end of the course students should be able to (1) explore how power and privilege impact us and others and how this relates to race, ethnicity, cultural identity, economic class, and environmental discrimination and (2) use wordview as a tool to understand different cultural responses to environmental challenges. Present and past cultural examples from around the world are examined to provide background for class discussions and exploration of hot topics and challenges that currently face us and how this relates to our diverse beliefs and levels of local and global power. F, odd years.

**ANTH 370. Language and Culture. 3 Credits.**
Fundamentals of modern linguistics; utility of linguistic concepts of culture analysis; interaction of language with other cultural subsystems. Prerequisite: ANTH 171 or consent of instructor. S.

**ANTH 371. Cultural Dynamics. 3 Credits.**
Focus on sociocultural change along a selected theme, such as "the local and the global," "ethnic minorities and nation-states," or "ethnographer as researcher and writer." Also considered are theoretical orientations in the study of society/culture, fieldwork, ethics, and anthropologists' roles with respect to public policy. Repeatable to 9 credits if topics vary. Prerequisite: ANTH 171. Repeatable to 9 credits. F.
ANTH 372. Culture Theory. 3 Credits.
An overview of the ideas and approaches that have played a role in the development of anthropological studies of societies and cultures. Focus on the contributions of major figures in anthropology, in the past and at present, as well as current issues within the discipline. Prerequisite: ANTH 171.

ANTH 373. Indians of Latin America. 3 Credits.
Examination of traditional and modern Indian cultures of Latin America. Focus on the adaptation to cultural change, the impact of world economy, and the impact of resource exploitation on indigenous peoples. Prerequisite: ANTH 171.

ANTH 375. Women in Prehistory. 3 Credits.
This course will explore recent research that explicitly illuminates women’s roles, behaviors and ideologies in the ancient past, and will examine methodological and theoretical attempts to understand how gender can be retrieved from the archaeological record. On demand.

ANTH 376. The Aztec, Maya and Inca. 3 Credits.
An examination of the high civilizations of Latin America with focus on the Aztec, Maya and Inca. On demand.

ANTH 377. North American Archaeology. 3 Credits.
Explores the fascinating cultural developments that have taken place throughout prehistory in North America (north of Mexico), ranging from the first peopling of the Americas to the emergence of complex chiefdoms, and from hunting and gathering to the development of intensive agriculture. On demand.

ANTH 378. Physical Anthropology Method and Theory. 1-4 Credits.
A discussion of current theoretical arguments within the field of physical anthropology and the techniques used to examine them. Prerequisite: ANTH 170. S.

ANTH 379. Culture Area Studies. 3 Credits.
A survey of peoples and cultures of selected areas. Selections based upon staff and student interest. May be repeated to maximum of 6 credits. Repeatable to 6 credits. F.S.

ANTH 380. Field Techniques in Archaeology. 1-6 Credits.
Prerequisites: ANTH 172 and permission of instructor. SS.

ANTH 385. Antiquities, Culture and Law. 3 Credits.
This course is an exploration of the complex cultural, ideological and legal issues involved in contemporary views of the ancient past and its material record. Students will examine how antiquities, archaeological sites, landscapes and monuments are defined and shaped by current cultural identities, notions of patrimony, human rights, power and prestige, and global conflicts. National and international laws that regulate the antiquities trade and address the illegal trafficking of artifacts will also be explored in the context of ethics and social problems. On demand.

ANTH 388. Method and Theory in Archaeology. 3 Credits.
This course explores how archaeologists reconstruct the past: how they formulate research problems and conduct field work; what field and laboratory analytical tools they employ; and how they use data, models, and theory to explain culture change. Techniques, methods, and theoretical frameworks used in modern prehistoric archaeology are examined. Readings in the professional literature, case studies, and guest lecturers provide vivid examples of archaeologists in thought and action. Prerequisite: ANTH 172 or consent of instructor. S.

ANTH 400. Archaeological Origins of Plant and Animal Use. 3 Credits.
This course uses archaeological information to examine the relationships between humans and the plant and animal resources we exploit and will focus on specific examples of economic uses of both wild and domestic species, covering both prehistoric and modern consequences of how we interact with biological resources. Basic issues in floral and faunal analysis such as the recovery, quantification, analysis, and interpretation of plant and animal remains from archaeological sites will be presented in depth. Prerequisite: ANTH 172. On demand.

ANTH 426. Lithic Technology. 3 Credits.
Study of prehistoric stone tool technology and examination of the analytical methods used by archaeologists in lithics research. Prerequisite: ANTH 172 or consent of instructor. F, odd years.

ANTH 439. Human Osteology. 4 Credits.
This course is an intensive examination of human skeletal anatomy, covering the features of the entire human skeleton and the relationship of human osteology to other fields, including paleoanthropology, palaeopathology, forensic anthropology, and vertebrate anatomy. Prerequisite: ANTH 170 or ANTH 270 or ANAT 204 or consent of instructor. F.

ANTH 441. Forensic Anthropology Field School. 1-6 Credits.
This course is a hands-on exposure to the field and laboratory methods of forensic anthropology. Prerequisite: Consent of instructor. SS.

ANTH 445. Culture, Illness and Health. 3 Credits.
Examination of culturally-based beliefs and practices involved in maintenance of health and the handling of illness in non-Western and modern societies. Prerequisite: ANTH 171 or consent of instructor. S.

ANTH 480. Senior Seminar. 3 Credits.
The seminar will examine current debates or an area of study involving two or more subfields of anthropology. The seminar will provide an opportunity for students to integrate knowledge and skills obtained in anthropology. Prerequisites: Senior major status and completion of two of the three method and theory requirements (cultural, archaeological, physical); or departmental permission.

ANTH 489. Senior Honors Thesis. 1-8 Credits.
Supervised independent study culminating in a thesis. Repeatable to 9 credits. Repeatable to 9 credits. F.S, SS.

ANTH 492. Independent Studies. 1-4 Credits.
Independent research conducted under advisement with department faculty. Research is student originated and developed. Prerequisite: Consent of the instructor. Repeatable to 16 credits. F.S.

ANTH 494. Readings in Anthropology. 1-5 Credits.
Designed for students who want instruction in subjects not covered adequately in usual course offerings. Special arrangements must be made with an instructor prior to registration. Prerequisite: Consent of the instructor. Repeatable to 5 credits. F.S.

ANTH 497. Forensic Science Internship. 1-12 Credits.
Students may enroll in this course after they have secured an intern position in a law enforcement agency, crime laboratory or other institution providing procedural and/or analytical processing of evidence from criminal or civil proceedings. Credits obtained will be determined based on length and content of the internship and course responsibilities. Prerequisites: Junior or Senior status, satisfactory completion of CHEM 122 and BIOL 151, and instructor consent. S/U grading. F.S, SS.

Bachelor of Arts in Anthropology

Required 120 credits (36 of which must be numbered 300 or above, and 30 of which must be from UND) including:

I. Essential Studies Requirements (see University ES listing).

II. The Following Curriculum (33 Major Credits):

ANTH 170 Introduction to Biological Anthropology 3
ANTH 171 Introduction to Cultural Anthropology 3
ANTH 172 Introduction to Archaeology 3
ANTH 480 Senior Seminar 3
Method and Theory
Select one of the following (Cultural):
ANTH 350 Ethnographic Methods 3
ANTH 371 Cultural Dynamics 3
ANTH 372 Culture Theory 3
Select one of the following (Archaeology):
ANTH 300 Archaeological Laboratory Methods 3
ANTH 375 Women in Prehistory 3
ANTH 380 Field Techniques in Archaeology 3
ANTH 388 Method and Theory in Archaeology 3
ANTH 420 Archaeological Origins of Plant and Animal Use 3
ANTH 426 Lithic Technology 3
Select one of the following (Physical):
ANTH 325 Human Origins 3
ANTH 330 Human Variation 3
ANTH 335 Primates 3
ANTH 378 Physical Anthropology Method and Theory 3
ANTH 439 Human Osteology 3
Electives in Anthropology  12
Total Credits  33

Required in other departments:

A concentration in a single supplementary field other than anthropology is also required of all anthropology majors. This concentration may be met in two ways:

1. a language proficiency of level IV in a modern foreign language; or
2. 20 credit hours, at least 9 of which must be numbered 300 or above, in any single subject matter taught at this university.

**Minor in Anthropology**

Required 21 credits including:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ANTH 170</td>
<td>Introduction to Biological Anthropology</td>
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<tr>
<td>ANTH 171</td>
<td>Introduction to Cultural Anthropology</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 172</td>
<td>Introduction to Archaeology</td>
<td>3</td>
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</table>

Select one of the following (Method and Theory):

<table>
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<tr>
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<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>ANTH 300</td>
<td>Archaeological Laboratory Methods</td>
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<tr>
<td>ANTH 325</td>
<td>Human Origins</td>
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<tr>
<td>ANTH 330</td>
<td>Human Variation</td>
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<tr>
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</tr>
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<td>ANTH 439</td>
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</tr>
</tbody>
</table>

Electives in Anthropology  9

Total Credits  21

**Art and Design (Art)**

B.A. with Major in Visual Arts

B.F.A. with Major in Visual Arts  (p. 37)

B.F.A. with Major in Graphic Design  (p. 37)

**College of Arts and Sciences**

Minor in Visual Arts (Studio)  (p. 38)

Minor in Art History and Museum Studies  (p. 38)

Minor in Graphic Design  (p. 38)

**College of Education and Human Development**

Minor in Visual Arts Education (Middle or Secondary)

See Minor in Art above.

**Courses**

**ART 110. Introduction to the Visual Arts. 3 Credits.**
Study and analysis of artistic methods and meaning in the visual arts. Films, original works, slides, discussions, demonstrations. Structure and meaning of visual art forms as revealed through the analysis of psychological applications of art media. F.S.

**ART 112. Two & Three Dimensional Design. 3 Credits.**
This is a foundation studio course which introduces design principles, aesthetic considerations, and basic techniques of working as they relate to the creation of two-dimensional and three-dimensional art. Appropriate art safety instruction will be included. F.S.

**ART 114. Visual Persuasion. 3 Credits.**
An introduction to basic principles of visual perception and interpretation, with emphasis on visual theories, cultural influences, historical and ethical perspectives. This course will provide an overview of ways in which visual elements are used to communicate and influence meaning, as well as provide students analytical tools to advance visual literacy. F.S.

**ART 200. Intro to Sculpture. 3 Credits.**
Introduction to philosophy, aesthetics, history, and processes of sculpture. Demonstration in the use of metals, stone, clay, plaster, wood, etc. Appropriate art safety instruction will be included. F.S.

**ART 204. Intro to Jewelry & Metalsmithing. 3 Credits.**
This studio course is an investigation into the tools, techniques, and processes fundamental to the designing and fabrication of contemporary wearable and non-wearable art executed predominantly in precious/semi-precious metal. The principles will be practiced and studied through individual projects, leading to proficiency for the making of body adornments, holloware, and simple fabricated objects. Appropriate art safety instruction will be included. F.S.

**ART 210. History of Art I. 3 Credits.**
Introductory survey of art history from Paleolithic to Renaissance. F.

**ART 211. History of Art II. 3 Credits.**
Introductory survey of art history from Renaissance to present. S.

**ART 220. Intro to Painting. 3 Credits.**
Experimentation with oil painting and associated media with emphasis upon creative compositions, using figure models, still-life subjects and imaginative contemporary expressions. Appropriate art safety instruction will be included. F.S.

**ART 230. Intro to Drawing. 3 Credits.**
Study and application of different drawing media, methods and techniques. Appropriate art safety instruction will be included. F.S.

**ART 240. Intro to Printmaking. 3 Credits.**
Introduction to basic traditional printmaking processes including relief, etching, lithography, and silkscreen printing. Appropriate art safety instruction will be included. F.S.

**ART 245. Intro to Black and White Photography. 3 Credits.**
Introduction to black and white photography in a visual arts environment. Emphasis is placed on developing an understanding of fine art photography through the practice of visualization and print making. Coursework includes an introduction to basic black and white film and paper processing. Appropriate art safety instruction will be included. F.S.

**ART 250. Intro to Ceramics: Handbuilding. 3 Credits.**
Introduction to ceramics techniques. A beginning course for majors. Proficiency in the basic hand forming processes and glazing techniques and an understanding of the clay and firing processes are achieved through lectures, discussions, demonstrations, and readings. Appropriate art safety instruction will be included. F.S.

**ART 253. Intro to Ceramics: Throwing. 3 Credits.**
Throwing is the process by which a form is made on the potter's wheel. During the semester emphasis is placed on centering the clay on the wheel and mastering basic forms, shaping techniques and glaze applications as well as firing processes. This is achieved through lectures, demonstrations, discussions, and readings. Appropriate art safety instruction will be included. F.S.

**ART 260. Intro to Color Photography. 3 Credits.**
A beginning non-darkroom oriented class in color photography emphasizing the aesthetic, design and compositional aspects of this artistic medium. Appropriate art safety instruction will be included. F.S.
ART 272. Digital Foundations. 3 Credits.
Introduction to the principles, techniques and history of digital media. This course will instruct in the application of computer software. Appropriate art safety instruction will be included. F.S.

ART 273. Intro to Graphic Design. 3 Credits.
An introduction to the art, language, key elements, theory and practice of graphic design. This course will focus on the integration of type, imagery and spatial relationships in design. Students will be introduced to the conceptual design process, communicating with clients, high quality crafting and production. Appropriate art safety instruction will be included. F.S.

ART 400. Advanced Sculpture. 3-6 Credits.
Continued study of advanced sculpture process and concepts and emphasis on the development of individual artistic direction. Appropriate art safety instruction will be included. May be repeated for credit without limitation. Prerequisite: ART 200. Repeatable. F.S.

ART 401. Advanced Jewelry and Metalsmithing. 3-6 Credits.
A continuation and expansion of Introduction to Jewelry and Metalsmithing. Specialized techniques and processes utilized in metal fabrication will produce works ranging from body adornment to small sculpture. Emphasis will be placed on the theoretical and conceptual growth of the student and the development of a self-directed personal aesthetic expression. Appropriate art safety instruction will be included. May be repeated for credit without limitation. Prerequisites: ART 204. Repeatable. F.S.

ART 403. Advanced Printmaking. 3-6 Credits.
Advanced work in all traditional and experimental print media, including photo-based printing, non-toxic printing processes, computer-generated printmaking and exploration of collaborative printing and construction of non-traditional multiples. Appropriate art safety instruction will be included. May be repeated for credit without limitation. Prerequisite: ART 240. Repeatable. F.S.

ART 404. Advanced Ceramics. 3-6 Credits.
This course will have specific technical ceramic applications, applicable to the exploration of advanced level hand building and/or throwing techniques. The conceptual development of the student's work is essential and may include both ceramic work and/or readings. Appropriate art safety instruction will be included. May be repeated for credit without limitation. Prerequisites: ART 245 or ART 260. Repeatable. F.S.

ART 405. Advanced Photography. 3-6 Credits.
Refinement of conceptual and formal qualities in silver or non-silver process photographic projects using color, black and white, and/or digital techniques. The scope of work and media will be determined by contractual arrangements between the student and instructor. Appropriate art safety instruction will be included. May be repeated for credit without limitation. Prerequisites: ART 245 or ART 253. Repeatable. F.S.

ART 410. Advanced History of Art. 3-6 Credits.
Study of varied topics in the history of art and architecture. May be repeated as title changes. Possible subjects may include but are not limited to: Non-Western Traditions, 20th 21st Century Art, Late 18th through 19th Century Art, Renaissance Baroque Art and Feminist Art. Prerequisites: ART 210 and ART 211. Repeatable. F.S.

ART 417. History of Art: Museum Studies Practicum. 3-6 Credits.
Experience working in an art exhibition setting involving practical experience, research, a written paper and presentation. Prerequisites: ART 210 and ART 211. Repeatable to 36 credits. F.S.

ART 420. Advanced Painting & Drawing. 3-6 Credits.
A continuation of both Introduction to Painting and Introduction to Drawing. Further development of painting and drawing concepts, comprehension and research of various media and styles. The course stresses the focus on one’s attitudes towards developing a more personal visual statement in areas of personal interest. Appropriate art safety instruction will be included. May be repeated for credit without limitation. Prerequisite: ART 220 or ART 230. Repeatable. F.S.

ART 460. Methods, Materials and Philosophy: Art in the Elementary Classroom. 3 Credits.
The study of art materials, methods, philosophy and projects applicable for special education, kindergarten through sixth grade students. Emphasis is on inter-curricular creativity using both 2-dimensional and 3-dimensional projects, featuring multi-cultural and disciplined-based education. Appropriate art safety instruction will be included. Prerequisite: Sophomore standing in TL or Art. F.S.

ART 461. Methods and Materials of Teaching Middle and Secondary School Art. 3 Credits.

ART 480. Advanced Graphic Design. 3-6 Credits.
Study and application of abstract representation in graphic design. Design methods and genres are examined during the production of promotional material including identity and business systems and campaigns. Ability to work metaphorically with image and design will be stressed. Focus will be on layout and composition. Continuing students will focus on application of graphic design principles to environmental and three-dimensional material including packaging, show room graphics, display and electronic media applications. Appropriate art safety instruction will be included. Repeatable. Prerequisite: ART 273. Repeatable. F.S.

ART 481. Art & Design Internship. 3 Credits.
Supervised work experience in studio art, art history design. Plan submitted by student and approved in advance by faculty and on-site supervisor. Final report, portfolio of work produced during internship, and employee evaluation required. Prerequisite: Instructor consent. F.S.

ART 490. Special Projects/Independent Research. 1-6 Credits.
Advanced independent study within a specific art discipline outside of subject areas normally covered within regularly scheduled courses in studio art, graphic design, art history and art education. Formal contract must be signed with professor of record. Repeatable, no more than 6 credits in each discipline area. Prerequisite: Instructor consent. Repeatable to 6 credits. F.S.

ART 491. Special Topics. 1-6 Credits.
Experience in specialized techniques and processes as they apply to various media both new and traditional. Offered on request. May be conducted either on laboratory or tutorial basis as subject matter permits. Appropriate art safety instruction will be included. Prerequisite: Instructor consent. Repeatable to 6 credits. F.S.

ART 498. Seminar in Art and Design Capstone. 3 Credits.
Discussions, reports, and presentations that analyze, synthesize and evaluate various topics derived from what students have learned in the Art Design program in relation to their entire university experience. Emphasis on critical thinking will be demonstrated through written and oral communication. Prerequisite: Junior or senior standing. S.

B.A. with Major in Visual Arts
Bachelor of Arts Majors in Visual Arts pursue one of the following tracks of study:

Art History and Museum Studies

Graphic Design

Studio Art

Required 120 credits (36 of which must be numbered 300 or above, and 30 of which must be from UND) including:

I. Essential Studies Requirements (see University ES listing).

II. The Following Curriculum of 42 major credits:

All BA degree majors in Art have a minimum requirement of 42 credits in Art, Art History or Graphic Design courses. Distribution of those credits is as follows:

Core Requirements (15 credits)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ART 112</td>
<td>Two &amp; Three Dimensional Design</td>
<td>3</td>
</tr>
<tr>
<td>ART 114</td>
<td>Art &amp; Design: First Year Seminar</td>
<td>3</td>
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<tr>
<td>ART 210</td>
<td>History of Art I</td>
<td>3</td>
</tr>
<tr>
<td>ART 211</td>
<td>History of Art II</td>
<td>3</td>
</tr>
<tr>
<td>ART 272</td>
<td>Digital Foundations</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Supportive Courses (6 credits)

200-level two-dimensional studio art course
200-level three-dimensional studio art course

Track of Study (18 credits) 18
B.F.A. with a Major in Graphic Design

Candidates seeking admission to the BFA program in Graphic Design must submit an application to the chairperson who will then schedule a portfolio presentation and personal interview for the candidate with a committee consisting of three departmental faculty members. Candidates accepted for the program will be expected to maintain a high standard of excellence, demonstrate significant artistic growth, and a 3.00 grade point average in all art courses. Before advancement to upper-division status, all B.F.A. candidates must participate in review and evaluation by the departmental faculty.

Before advancement to upper-division status, all B.F.A. candidates must participate in review and evaluation by the departmental faculty.

Major Emphasis Area Courses

At least 24 credits must be completed in one of the following emphasis areas:

- Ceramics
- Jewelry & Metalsmithing
- Photography
- Printmaking
- Sculpture
- Painting & Drawing

Required 120 credits (36 of which must be numbered 300 or above, and 30 of which must be from UND) including:

I. Essential Studies Requirements (see University ES listing).

II. The following curriculum of 69 major credits:

All BFA degree majors in Art have a minimum requirement of 69 credits in Art, Art History, Graphic Design courses. Distribution of those credits is as follows:

Core Requirements (15 credits)

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ART 112</td>
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<tr>
<td>ART 114</td>
<td>3</td>
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<tr>
<td>ART 210</td>
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<tr>
<td>ART 211</td>
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<tr>
<td>ART 272</td>
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<tr>
<td>Additional supportive courses (12 credits)</td>
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<td>200-level two-dimensional studio art courses</td>
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<td>200-level three-dimensional studio art courses</td>
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<td>Studies in Art History (6 credits)</td>
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<td>Any 400-level art history courses</td>
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<td>Studies in Graphic Design (24 credits)</td>
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<td>Art &amp; Design Electives (12 credits)</td>
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<tr>
<td>Exhibition Requirement</td>
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</table>

Total Credits 69

* All B.F.A. candidates are also required to produce a B.F.A Exhibition with the approval of their faculty advisor.

B.F.A. with a Major in Visual Arts

The Bachelor of Fine Arts program in Art is offered to students with marked abilities who desire an intensive undergraduate concentration in visual art, in preparation for either a career as a professional artist, for graduate study leading to the MFA, or both. Candidates accepted for the program will be expected to maintain a high standard of excellence, demonstrate significant artistic growth, and a 3.00 grade point average in all art courses. Candidates seeking admission to the BFA program must submit an application to the chairperson who will then schedule a portfolio presentation and personal interview for the candidate with a committee consisting of three departmental faculty members. Each student’s portfolio will be reviewed annually by departmental faculty, who will make a recommendation concerning the student’s status in the B.F.A. program. If probation is recommended, students may apply for readmission at the completion of a full semester. Readmission will be contingent upon faculty evaluation.

Before advancement to upper-division status, all B.F.A. candidates must participate in review and evaluation by the departmental faculty.

Teacher Licensure

Through a partnership with the College of Education and Human Development and the Department of Teaching and Learning, students may seek a K-12 licensure in Art. The following program of study must be completed:

I. Requirements for the B.A. or B.F.A. with major in Visual Arts or Art History.
II. Admission to the Teacher Education Program, normally while taking T&L 250 Introduction to Education. (See College of Education and Human Development [https://education.und.edu] for admission and licensing requirements.)

III. The program in K-12 Education, to include:

- T&L 250 Introduction to Education 3
- T&L 319 Integrating Diverse Needs in Educational Settings 3
- T&L 339 Educational Technology 2
- T&L 345 Curriculum, Instruction, and Assessment 3
- T&L 350 Development and Education of the Adolescent 3
- ART 461 Methods and Materials of Teaching Middle and Secondary School Art 3
- T&L 432 Learning Environments 3
- T&L 433 Multicultural Education 3
- T&L 486 Field Experience 1
- T&L 487 Student Teaching 16
- T&L 488 Senior Seminar 1

Total Credits 41

* T&L 390 Special Topics, may be taken as an elective.

Art majors seeking a K-12 licensure must have an adviser in both the Art & Design Department and the Department of Teaching and Learning.

Bachelor of Arts with Major in Visual Arts

Bachelor of Arts Majors in Visual Arts pursue one of the following tracks of study:

- **Art History and Museum Studies**
- **Graphic Design**
- **Studio Art**

Required 120 credits (36 of which must be numbered 300 or above, and 30 of which must be from UND) including:

I. Essential Studies Requirements (see University ES listing).

II. The Following Curriculum of 42 major credits:

- **Core Requirements (15 credits)**
  - ART 112 Two & Three Dimensional Design 3
  - ART 114 Art & Design: First Year Seminar 3
  - ART 210 History of Art I 3
  - ART 211 History of Art II 3
  - ART 272 Digital Foundations 3

- **Additional Supportive Courses (6 credits)**
  - 200-level two-dimensional studio art course 6
  - 200-level three-dimensional studio art course 6

- **Track of Study (18 credits)**
  - 200-level courses within track of study (0-6 credits) 18
  - 400-level courses within track of study (12-18 credits) 18

- **Art & Design Electives (3 credits)**
- **Exhibition Requirement**
  - 400-level art history, graphic design or studio art course outside track of study 3

Total Credits 42

Bachelor of Fine Arts with Major in Graphic Design

Candidates seeking admission to the BFA program in Graphic Design must submit an application to the chairperson who will then schedule a portfolio presentation and personal interview for the candidate with a committee consisting of three departmental faculty members. Candidates accepted for the program will be expected to maintain a high standard of excellence, demonstrate significant artistic growth, and a 3.00 grade point average in all art courses. Before advancement to upper-division status, all B.F.A. candidates must participate in review and evaluation by the departmental faculty.

Each student’s portfolio will be reviewed annually by departmental faculty, which will make a recommendation concerning the student’s status in the program. If probation is recommended, students may apply for readmission at the completion of a full semester. Readmission in the B.F.A. program in Graphic Design will be contingent upon faculty evaluation.

**Majors in Graphic Design must complete at least 24 credits in Graphic Design.**

Required 120 credits (36 of which must be numbered 300 or above, and 30 of which must be from UND) including:

I. Essential Studies Requirements (see University ES listing).

II. The following curriculum of 69 major credits:

- **Core Requirements (15 credits)**
  - ART 112 Two & Three Dimensional Design 3
  - ART 114 Art & Design: First Year Seminar 3
  - ART 210 History of Art I 3
  - ART 211 History of Art II 3
  - ART 272 Digital Foundations 3

- **Additional Supportive Courses (12 credits)**
  - 200-level two-dimensional studio art courses 6
  - 200-level three-dimensional studio art courses 6

- **Studies in Art History (6 credits)**
  - Any 400-level art history courses 6

- **Studies in Graphic Design (24 credits)**
  - 200-level Graphic Design Courses 3
  - 400-level Graphic Design Courses 21

- **Art & Design Electives (12 credits)**
  - 400-level studio art courses outside Graphic Design 6
  - 400-level art history, graphic design or studio art courses 6

- **Exhibition Requirement**
  - 400-level art history, graphic design or studio art course outside track of study 3

Total Credits 69

* All B.F.A. candidates are also required to produce a BFA Exhibition with the approval of their faculty advisor.

Bachelor of Fine Arts with Major in Visual Arts

The Bachelor of Fine Arts program in Art is offered to students with marked abilities who desire an intensive undergraduate concentration in visual art, in preparation for either a career as a professional artist, for graduate study leading to the MFA, or both. Candidates accepted for the program will be expected to maintain a high standard of excellence, demonstrate significant artistic growth, and a 3.00 grade point average in all art courses.

Candidates seeking admission to the BFA program must submit an application to the chairperson who will then schedule a portfolio presentation and personal interview for the candidate with a committee consisting of three departmental faculty members. Candidates accepted for the program will be expected to maintain a high standard of excellence, demonstrate significant artistic growth, and a 3.00 grade point average in all art courses.
faculty members. Each student’s portfolio will be reviewed annually by departmental faculty, who will make a recommendation concerning the student’s status in the BFA program. If probation is recommended, students may apply for readmission at the completion of a full semester. Readmission will be contingent upon faculty evaluation.

Before advancement to upper-division status, all BFA candidates must participate in review and evaluation by the departmental faculty.

**Major Emphasis Area Courses**

At least 24 credits must be completed in one of the following emphasis areas:

- Ceramics
- Jewelry & Metalsmithing
- Photography
- Printmaking
- Painting & Drawing

Required 120 credits (36 of which must be numbered 300 or above, and 30 of which must be from UND) including:

I. Essential Studies Requirements (see University ES listing).

II. The Following Curriculum of 69 major credits:

All BFA degree majors in Art have a minimum requirement of 69 credits in Art, Art History or Graphic Design courses. Distribution of those credits is as follows:

**Core Requirements (15 credits)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ART 112</td>
<td>Two &amp; Three Dimensional Design</td>
<td>3</td>
</tr>
<tr>
<td>ART 114</td>
<td>Art &amp; Design: First Year Seminar</td>
<td>3</td>
</tr>
<tr>
<td>ART 210</td>
<td>History of Art I</td>
<td>3</td>
</tr>
<tr>
<td>ART 211</td>
<td>History of Art II</td>
<td>3</td>
</tr>
<tr>
<td>ART 272</td>
<td>Digital Foundations</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional support courses (12 credits)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>200-level two-dimensional studio art courses (6 credits)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>200-level three-dimensional studio art courses (6 credits)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Studies in Art History (6 credits)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>400-level art history courses</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Studies in Studio Art Emphasis Area (24 credits)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>200-level studio art courses (3-6 credits)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>200-level studio art courses (18-21 credits)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Art & Design Electives (12 credits)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>400-level two-dimensional studio art course outside of emphasis area</td>
<td></td>
<td></td>
</tr>
<tr>
<td>400-level three-dimensional studio art course outside of emphasis area</td>
<td></td>
<td></td>
</tr>
<tr>
<td>400-level art history, graphic design or studio art courses (6 credits)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Exhibition Requirement**

- All BFA candidates are also required to produce a BFA Exhibition with the approval of their faculty advisor.

**Teacher Licensure**

Through a partnership with the College of Education and Human Development and the Department of Teaching and Learning, students may seek a K-12 licensure in Art. The following program of study must be completed:

I. Requirements for the B.A. or B.F.A. with major in Visual Arts or Art History.

II. Admission to the Teacher Education Program, normally while taking T&L 250 Introduction to Education. (See College of Education and Human Development (https://education.und.edu) for admission and licensing requirements.)

III. The program in K-12 Education, to include:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>T&amp;L 250</td>
<td>Introduction to Education</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 319</td>
<td>Integrating Diverse Needs in Educational Settings</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 339</td>
<td>Educational Technology</td>
<td>2</td>
</tr>
</tbody>
</table>

**Minor in Art History and Museum Studies**

Required 21 credits including:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ART 112</td>
<td>Two &amp; Three Dimensional Design</td>
<td>3</td>
</tr>
<tr>
<td>ART 210</td>
<td>History of Art I</td>
<td>3</td>
</tr>
<tr>
<td>ART 211</td>
<td>History of Art II</td>
<td>3</td>
</tr>
<tr>
<td>ART 230</td>
<td>Intro to Drawing</td>
<td>3</td>
</tr>
<tr>
<td>400-level art history courses</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Minor in Graphic Design**

Required 21 credits including:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ART 112</td>
<td>Two &amp; Three Dimensional Design</td>
<td>3</td>
</tr>
<tr>
<td>ART 230</td>
<td>Intro to Drawing</td>
<td>3</td>
</tr>
<tr>
<td>ART 272</td>
<td>Digital Foundations</td>
<td>3</td>
</tr>
<tr>
<td>ART 273</td>
<td>Intro to Graphic Design</td>
<td>3</td>
</tr>
<tr>
<td>400-level graphic design courses</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Minor in Visual Arts (Studio)**

Required 21 credits including:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ART 110</td>
<td>Introduction to the Visual Arts</td>
<td>3</td>
</tr>
<tr>
<td>ART 112</td>
<td>Two &amp; Three Dimensional Design</td>
<td>3</td>
</tr>
<tr>
<td>200-level two-dimensional studio art course</td>
<td></td>
<td></td>
</tr>
<tr>
<td>200-level three-dimensional studio art course</td>
<td></td>
<td></td>
</tr>
<tr>
<td>200/400-level studio art or art history courses</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Arts and Sciences (A & S)**

Minor in Canadian Area Studies (p. 40)

Certificate in Diversity and Inclusion (p. 39)

**Courses**

**A&S 100. Introduction to Peer Mentoring. 1 Credit.**

This seminar will serve as an introduction to the Peer Mentor program in the College of Arts Sciences and will include needed training modules for that program. Prerequisite: Successful application to the College of Arts Sciences Peer Mentor program; must obtain permission number from instructor. SS.
A&S 250. Arts & Sciences. 1-4 Credits.  
Repeatable to 21 credits.
A&S 251. Study in Canada. 1-12 Credits.  
One to twelve credits in any one semester (repeatable with permission of the student's academic department); a course load required to maintain full-time status; at least Sophomore status required; GPA of at least 2.50; must become familiar with Canadian study procedures, application, credit transfer and other matters as outlined in the Study Abroad Handbook; courses to be taken during a study in Canada must have pre-approval from student's academic department. Prerequisites: Sophomore status or higher and a GPA of 2.5 or higher. Repeatable. F, SS.
A&S 252. Introduction to Canadian Studies. 3 Credits.  
An interdisciplinary, team-taught course focusing on the historical, geographical, socio-cultural, literary, political, economic, and international qualities that make Canada and its communities both vibrant and unique. F.
A&S 260. Exploring Topical Challenges. 3 Credits.  
Students will conduct signature work in interdisciplinary teams based on semester-long themes. The first half of the course will focus on exploration and inquiry on a chosen theme (varies by semester). The second half of the course will focus on student-driven group projects designed to enhance students’ ability to work in diverse teams and engage in unstructured problem solving. Prerequisites: ENGL 130; 23 completed credit hours. F, S.
A&S 294. Directed Studies. 1-4 Credits.  
Specially arranged individual tutorials, projects, or reading programs on a variety of subjects not covered by regular departmental offerings. May be initiated by students with approval of dean and departments involved, provided appropriate faculty members are willing. Repeatable. On demand.
A&S 299. Special Topics. 1-4 Credits.  
Specially arranged seminars or courses on a variety of subjects not covered by regular departmental offerings. May be initiated by students with approval of dean and departments involved, provided appropriate faculty members are willing. Repeatable. On demand.
A&S 351. Introduction to Law and Legal Studies. 3 Credits.  
Segments on Contracts, Criminal Law, Constitutional Law, and Torts, taught in customary law school manner to acquaint undergraduates and others interested in exploring a career in the legal profession with law school methodology and legal analysis. 
A&S 497. Internship. 1-4 Credits.  
This internship is a short-term work experience emphasizing hands-on learning that is not covered by regular departmental offerings. Prerequisite: Permission of instructor. Repeatable to 12 credits. F, S, SS.
A&S 499. Special Topics. 1-4 Credits.  
Specially arranged seminars or courses on a variety of subjects not covered by regular departmental offerings. May be initiated by students with approval of dean and departments involved, provided appropriate faculty members are willing. Repeatable. As topics vary. Repeatable.

Certificate in Diversity and Inclusion

A total of 16 credit hours within the following:

Core Course: One of the following (3 credits):
- ANTH 372 Culture Theory 3
- COUN 250 Dialogue on U.S. Diversity 3
- ENGL 228 Diversity in Global Literatures 3
- ENGL 229 Diversity in U.S. Literatures 3
- PHIL 342 Advanced Ethics 3
- PSYC 421 Diversity Psychology 3
- SOC 250 Diversity in American Society 3
- SWK 493A Special Topics (Diversity and International Social Welfare Through a Social Work Lens) 1-3

Area Courses: One course from four of the following areas (12 credits):
- Sex, Gender 3
- Race, Ethnicity, Nationality 3
- Religion 3
- Social/Economic Class 3
- Ability 3
- Age 3
- Applied Experience (1 credit): As approved for the Diversity & Inclusion Certificate
- Workshop: Seminar courses related to diversity & inclusion, e.g., IMPACT, COUN 399
- Internship/Co-op: Student must propose how experience relates to diversity
- Contact hours: At least 50 contact hours in the forms of volunteer work, shorter workshops or presentations, conference attendance (diversity-specific), or others as approved by the College of Arts & Sciences

Area Courses:

<table>
<thead>
<tr>
<th>Area Courses:</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex/Gender</td>
<td></td>
</tr>
<tr>
<td>ANTH 375 Women in Prehistory</td>
<td>3</td>
</tr>
<tr>
<td>CJ 307 Women, Crime, and Criminal Justice</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 357 Women Writers and Readers</td>
<td>3</td>
</tr>
<tr>
<td>HIST 332 Women in Early America</td>
<td>3</td>
</tr>
<tr>
<td>HIST 333 Women in Modern America</td>
<td>3</td>
</tr>
<tr>
<td>IS 346 Gender in American Indian Cultures</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 210 Human Sexuality</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 365 Psychology of Women</td>
<td>3</td>
</tr>
<tr>
<td>RELS 216</td>
<td>3</td>
</tr>
<tr>
<td>SOC 340 Sociology of Gender</td>
<td>3</td>
</tr>
<tr>
<td>WGS 200 Introduction to Gender Studies</td>
<td>3</td>
</tr>
<tr>
<td>WGS 225 The Study of Women</td>
<td>3</td>
</tr>
<tr>
<td>WGS 480 Feminist Theory</td>
<td>3</td>
</tr>
<tr>
<td>Race, Ethnicity, Nationality</td>
<td></td>
</tr>
<tr>
<td>ANTH 373 Indians of Latin America</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 365 Black American Writers</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 367 American Indian Literatures</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 415 Seminar in Literature (Asian-American Literature and Theory)</td>
<td>1-4</td>
</tr>
<tr>
<td>ENGL 415 Seminar in Literature (Latina/o Literature and Theory)</td>
<td>1-4</td>
</tr>
<tr>
<td>HIST 371 African-American History since 1877</td>
<td>3</td>
</tr>
<tr>
<td>IS 123 American Indians and Culture</td>
<td>3</td>
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<tr>
<td>SOC 435 Racial and Ethnic Relations</td>
<td>3</td>
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<tr>
<td>Religion</td>
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<td>RELS 101</td>
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<td>RELS 102</td>
<td>3</td>
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<tr>
<td>RELS 315</td>
<td>3</td>
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<tr>
<td>RELS 320</td>
<td>3</td>
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<tr>
<td>RELS 355</td>
<td>3</td>
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<tr>
<td>RELS 380</td>
<td>3</td>
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<tr>
<td>Social/Economic Class</td>
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<tr>
<td>PHIL 355 Social and Political Philosophy</td>
<td>3</td>
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<tr>
<td>SOC 407 Political Sociology</td>
<td>3</td>
</tr>
<tr>
<td>SOC 436 Social Inequality</td>
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<tr>
<td>Ability</td>
<td></td>
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<tr>
<td>IS 311 Health and American Indian Cultures</td>
<td>3</td>
</tr>
<tr>
<td>RHS 250 Contemporary Issues in Rehabilitation</td>
<td>3</td>
</tr>
<tr>
<td>RHS 260 Inclusion in Recreation Settings</td>
<td>3</td>
</tr>
<tr>
<td>RHS 350 Overview of Disabilities</td>
<td>3</td>
</tr>
<tr>
<td>Age</td>
<td></td>
</tr>
<tr>
<td>PSYC 355 Adulthood and Aging</td>
<td>3</td>
</tr>
<tr>
<td>RELS 245</td>
<td>3</td>
</tr>
<tr>
<td>SOC 352 Aging and Society</td>
<td>3</td>
</tr>
<tr>
<td>SWK 313 Orientation to Gerontology</td>
<td>3</td>
</tr>
</tbody>
</table>
Minor in Canadian Area Studies

Housed in the College of Arts and Sciences, this is an interdisciplinary 20-credit minor in Canadian Area Studies. There are three required courses:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 362</td>
<td>Geography of Canada</td>
<td>3</td>
</tr>
<tr>
<td>HIST 204</td>
<td>Canada to 1867</td>
<td>3</td>
</tr>
<tr>
<td>or HIST 205</td>
<td>Canada since 1867</td>
<td>3</td>
</tr>
<tr>
<td>A&amp;S 252</td>
<td>Introduction to Canadian Studies</td>
<td>3</td>
</tr>
</tbody>
</table>

At least 6 additional credits must be taken at the upper-division level.

Students will be able to choose an area of concentration from among the following:

French Canada (for the student with sufficient background in the French language), total 20 hours.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FREN 307</td>
<td>A Social and Cultural History of Québec</td>
<td>3</td>
</tr>
<tr>
<td>FREN 373</td>
<td>North American Francophone Cultures through Literature and Film</td>
<td>3</td>
</tr>
<tr>
<td>FREN 494</td>
<td>Individual French Readings</td>
<td>1-3</td>
</tr>
<tr>
<td>HIST 300</td>
<td>Topics in History</td>
<td>1</td>
</tr>
</tbody>
</table>

Required Courses

Any combination of courses from the approved list (see below)

Native, total 11-12 hours

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IS 250</td>
<td>Lakota Language I</td>
<td>3</td>
</tr>
<tr>
<td>IS 251</td>
<td>Lakota Languages II</td>
<td>3</td>
</tr>
<tr>
<td>IS 350</td>
<td>Native American Languages</td>
<td>3</td>
</tr>
<tr>
<td>IS 201</td>
<td>History of the Sioux</td>
<td>3</td>
</tr>
<tr>
<td>IS 203</td>
<td>History of the Ojibwe</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 377</td>
<td>North American Archaeology</td>
<td>3</td>
</tr>
<tr>
<td>HIST 399</td>
<td>Selected Topics in History (when applicable)</td>
<td>2-3</td>
</tr>
</tbody>
</table>

Required Courses

Any of the above listed courses 11-12

Courses which carry credit for the Canadian Area Studies minor:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANTH 377</td>
<td>North American Archaeology</td>
<td>3</td>
</tr>
<tr>
<td>A&amp;S 251</td>
<td>Study in Canada</td>
<td>1-12</td>
</tr>
<tr>
<td>A&amp;S 252</td>
<td>Introduction to Canadian Studies</td>
<td>3</td>
</tr>
<tr>
<td>IS 250</td>
<td>Lakota Language I</td>
<td>3</td>
</tr>
<tr>
<td>IS 251</td>
<td>Lakota Languages II</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 367</td>
<td>American Indian Literatures</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 415</td>
<td>Seminar in Literature</td>
<td>3</td>
</tr>
<tr>
<td>FREN 307</td>
<td>A Social and Cultural History of Québec</td>
<td>3</td>
</tr>
<tr>
<td>FREN 373</td>
<td>North American Francophone Cultures through Literature and Film</td>
<td>3</td>
</tr>
<tr>
<td>FREN 494</td>
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<td>1-3</td>
</tr>
<tr>
<td>GEOG 362</td>
<td>Geography of North America I</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 362</td>
<td>Geography of Canada</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 462</td>
<td>Geography of North America II</td>
<td>3</td>
</tr>
<tr>
<td>HIST 204</td>
<td>Canada to 1867</td>
<td>3</td>
</tr>
<tr>
<td>HIST 205</td>
<td>Canada since 1867</td>
<td>3</td>
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<tr>
<td>HIST 300</td>
<td>Topics in History (History of Quebec)</td>
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</tr>
<tr>
<td>HIST 300</td>
<td>Topics in History (History of the Canadian West)</td>
<td>1</td>
</tr>
<tr>
<td>HIST 300</td>
<td>Topics in History (History of the Canadian North)</td>
<td>1</td>
</tr>
<tr>
<td>HIST 399</td>
<td>Selected Topics in History (when applicable)</td>
<td>2-3</td>
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<tr>
<td>HIST 421</td>
<td>The British Empire, 1496-1894</td>
<td>3</td>
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<tr>
<td>HIST 422</td>
<td>The British Empire and Commonwealth, 1884-the Present</td>
<td>3</td>
</tr>
</tbody>
</table>

Athletic Training

(See Sports Medicine (p. 205) listing)

Athletic Training

(B.S. in Athletic Training (p. 41))

Courses

ATSC 100. Atmospheric Sciences Orientation. 1 Credit.

This course is required for all atmospheric sciences majors. Its purpose is to prepare new students for their university and professional careers by discussing university policies, the advising process, and career options. S/U grading. F.

ATSC 110. Meteorology I. 3 Credits.

Elements of the atmosphere with emphasis on those processes that affect the global atmospheric circulation. Includes laboratory. Corequisite: ATSC 110L. F.S.

ATSC 110L. Meteorology I Laboratory. 1 Credit.

Laboratory to accompany ATSC 110. Corequisite: ATSC 110. F.S.

ATSC 110L. Introduction to Synoptic Meteorology. 4 Credits.

The analysis and portrayal of synoptic weather information. Kinematic flow analyses of barotropic and baroclinic systems. Introduction to many of the products produced by NWS. Includes laboratory. Prerequisites: ATSC 110 and MATH 146 or MATH 165. F.

ATSC 220. Extreme Weather and Climate. 3 Credits.

Severe weather is a leading cause of death, injury and property damage. Students will gain an understanding and appreciation of extreme weather events, their impact on society, minimizing risk and the use of technology in detection and forecasting. Students will also learn how climate change impacts the occurrence and severity of extreme weather events. Prerequisite: ATSC 110. F.S.

ATSC 231. Aviation Meteorology. 4 Credits.

A study of weather hazards, meteorological flight planning, aviation weather equipment and human factors in weather flying safety. Prerequisite: ATSC 110. F.S.

ATSC 240. Meteorological Instrumentation. 4 Credits.

A study of the theory, design, and accuracy of instrumentation for the measurement of temperature, pressure, humidity, wind, and radiation. In addition, topics such as radar, and the use of aircraft and balloons as instrument platforms are also discussed. Includes laboratory. Prerequisites: ATSC 110 and MATH 103. S.

ATSC 252. Applied Weather Modification. 4 Credits.

Provides a comprehensive introduction to basic concepts of weather modification as currently practiced around the world. It includes a study of cloud physics and seeding theory, a review of past and current programs, and a discussion of related legal, societal, economic and environmental issues. Includes laboratory. Prerequisites: ATSC 110 and CSCI 130. S.

ATSC 270. Computer Concepts in Meteorology. 3 Credits.

The course introduces students to the programming knowledge needed for manipulating observational and model data in the earth sciences. Topics include data visualization, Linux and shell scripting, advanced file I/O, and memory management. The example problems utilize datasets commonly found in the atmospheric sciences. Prerequisites: ATSC 110 and CSCI 130. S.
ATSC 310. Introduction to Weather Forecasting. 3 Credits.
An operations approach to application of practical methodologies of weather analysis using computer textual and graphic analysis systems. Involves routine weather laboratory activities commonly found within the operational sector of meteorology. Prerequisite: ATSC 210. S.

ATSC 315. Broadcast Meteorology. 3 Credits.
An introduction to the field of broadcast meteorology which provides an overview of television production, the profession of broadcast meteorology, AMS Seal requirements, ethics and the production, organization, critique, and presentation of weather information. Prerequisites: ATSC 310 and Communication or Atmospheric Sciences major. F, even years.

ATSC 345. Remote Sensing of the Atmosphere. 3 Credits.
Fundamental remote sensing concepts and tools including fundamental radiative processes in the atmosphere. Principles and applications of satellite and radar and their uses as meteorological observation and research tools. Additional instruments may be discussed including lidar, wind profilers, radio acoustic profilers, and other profiling systems. Prerequisites: ATSC 210 and MATH 166. F.

ATSC 350. Atmospheric Thermodynamics. 3 Credits.
An introduction to the theory and application of atmospheric thermodynamics used in synoptic, meso- and microscale meteorology. The course covers the principles of classical thermodynamics and how they are applied to atmospheric processes. Prerequisites: ATSC 270, MATH 166, and PHYS 251. F.

ATSC 353. Physical Meteorology. 3 Credits.
A study of atmospheric processes and properties from a physical standpoint. Includes atmospheric radiation, aerosols, cloud microphysics, and climate dynamics. Prerequisite: ATSC 345. S.

ATSC 355. Surface Transportation Weather I. 3 Credits.
An introduction to the concepts, practices and methodologies used in the surface transportation weather industry. Includes configuration, siting, and data management/quality control of environmental sensor stations, fundamentals of surface transportation weather forecasting, overview of winter road maintenance methods, and applications of geographical information systems technologies in a weather and road maintenance environment. Prerequisites: ATSC 210 and ATSC 240. F, odd years.

ATSC 360. Dynamic Meteorology. 4 Credits.
Basic equations of motion, atmospheric thermodynamics, balanced motions, and atmospheric disturbances are examined on an introductory level. Prerequisite: ATSC 350. Prerequisite or Corequisite: MATH 266. S.

ATSC 397. Cooperative Education. 1-8 Credits.
A cooperative educational experience. Students will be required to work at an approved work site while enrolled in the course. May be repeated to a total of 12 credits. Prerequisites: Overall GPA of 2.5 or higher and approval of the Coordinator of Atmospheric Sciences cooperative education. Repeatable to 12 credits. S/U grading. F,S,SS.

ATSC 405. Numerical Methods in Meteorology. 3 Credits.
This course is designed to introduce students to numerical methods used to solve mathematical problems that are difficult to solve analytically. The course is designed to focus on numerical problems encountered in the field of atmospheric science. Prerequisites: ATSC 360 and MATH 266. F.

ATSC 411. Synoptic Meteorology. 4 Credits.
Development and application of quasi-geostrophic theory, including its application to the development and propagation of surface and upper-level systems, isentropic analysis, IPV theory, fronts, jets, and the relation between the synoptic environment and convection. Includes a laboratory in which concepts are reinforced through map discussion, map analysis, forecasting exercises and forecasting techniques. Prerequisites: ATSC 210 and ATSC 360. F.

ATSC 441. Radar Meteorology. 4 Credits.
Advanced radar theory, including basic radar principles, digital processing of radar signals, Doppler radar principles, displays, polarization techniques, and characteristic returns. Includes laboratory. Prerequisite: ATSC 345 or consent of instructor. S, odd years.

ATSC 450. Introduction to Cloud Physics Meteorology. 4 Credits.
A study of the physics of clouds with emphasis on microphysical processes involved in cloud formation, precipitation production, and dissipation. Includes Laboratory. Prerequisites: ATSC 350 and ATSC 353. F, odd years.

ATSC 455. Surface Transportation Weather II. 3 Credits.
An in-depth exploration of surface transportation meteorology designed to prepare students for a career in operational surface transportation meteorology. Includes application of mesoscale weather prediction models in a surface transportation environment, introduction to pavement condition modeling, forecast verification methods, and an introduction to methods of maintenance decision-making. Prerequisites: ATSC 310 and ATSC 355. S, even years.

ATSC 456. Introduction to Professional Meteorology. 3 Credits.
A survey of the structure and methods found within the operational and private sector weather community. Provide orientation of professional meteorology methods. While the government sector of operational meteorology will be discussed, the emphasis of the course will focus on aspects of private sector meteorology. Prerequisite or Corequisite: ATSC 350. F, odd years.

ATSC 460. Mesoscale Dynamics. 4 Credits.
An introduction to mesoscale dynamics and forecasting. Topics include mesoscale circulations, warm and cold season weather systems, terrain induced weather systems, tropical systems and mesoscale models. Prerequisite: ATSC 360. S.

ATSC 492. Senior Project I. 1 Credit.
A capstone project demonstrating a breadth and depth of knowledge in atmospheric sciences. An original student investigation of a topic to be selected in consultation with a supervising faculty member of the department. Students will demonstrate the ability to communicate their research through both oral and written communication at an advanced level. Prerequisites: Senior Standing in Atmospheric Sciences and consent of advisor. F.S.

ATSC 493. Senior Project II. 2 Credits.
This is the second semester of a capstone course intended to be a culminating experience. Students are expected to demonstrate a breadth and depth of knowledge in atmospheric sciences. Students will continue to investigate an original topic to be selected in consultation with a supervising faculty member of the department. Students will demonstrate the ability to communicate their research through both oral and written communication at an advanced level. Prerequisite: ATSC 492. F.S.

ATSC 494. Special Studies in Meteorology. 1-4 Credits.
Designed for those students who wish to pursue advanced topics in meteorology on an individual basis. May be repeated with change of subject matter to a maximum of four credit hours. Prerequisites: Upper division status and consent of the instructor. Repeatable to 4 credits. F,S,SS.

ATSC 497. Internship. 1-8 Credits.
Field experiences in various areas of meteorology will be offered as available. May be repeated up to a total of 12 credits. Prerequisite: Permission of instructor and dean. Repeatable to 12 credits. S/U grading. F,S,SS.

ATSC 499. Topics in Meteorology. 2-4 Credits.
This course will cover one or more topics in meteorology of special interest to upper division students. Course may be repeated up to a maximum of 6 credits. Prerequisite: Consent of instructor. Repeatable to 6 credits. F.S.

Bachelor of Science in Atmospheric Sciences

Requires 120 credits (36 of which must be number 300 or above) including:

I. Essential Studies Requirements (see University ES listing).

II. Center for Aerospace Sciences requirements.

III. The Following Curriculum:

Freshman Year

First Semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ATSC 100</td>
<td>Atmospheric Sciences Orientation</td>
<td>1</td>
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<tr>
<td>ATSC 110</td>
<td>Meteorology I</td>
<td>3</td>
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<tr>
<td>ATSC 110L</td>
<td>Meteorology I Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>ENGL 110</td>
<td>College Composition I</td>
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<tr>
<td>MATH 165</td>
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<tr>
<td>ES Elective</td>
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<td></td>
<td><strong>Total Credits</strong></td>
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Second Semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>MATH 166</td>
<td>Calculus II</td>
<td>4</td>
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</tbody>
</table>
Minor in Atmospheric Sciences

Requires 20 credits including:

- ATSC 110  Meteorology I  3
- ATSC 110L  Meteorology I Laboratory  1
- ATSC 210  Introduction to Synoptic Meteorology  4
- ATSC 310  Introduction to Weather Forecasting  3
- Atmospheric Science Electives  9

Total Credits  20

The following courses may not count towards the Atmospheric Sciences Electives for the minor:

- ATSC 100  Atmospheric Sciences Orientation  1
- ATSC 120  Severe and Hazardous Weather  3
- ATSC 397  Cooperative Education  1-8
- ATSC 494  Special Studies in Meteorology  1-4

Aviation (Avit)

John D. Odegard School of Aerospace Sciences

B.S. in Aeronautics with a Major in Air Traffic Management (p. 47)
B.S. in Aeronautics with a Major in Aviation Studies (p. 48)
B.S. in Aeronautics with a Major in Commercial Aviation (p. 48)
B.S. in Aeronautics with a Major in Flight Education (p. 49)
B.S. in Aeronautics with a Major in Unmanned Aircraft Systems Operations (p. 49)

College of Business and Public Administration

B.B.A. with a Major in Airport Management (p. 148)
B.B.A. with a Major in Aviation Management (p. 149)
Minor in Professional Flight (p. 50)
Minor in Aviation Management (p. 50)
Minor in Unmanned Aircraft Systems (p. 50)

Optional Specializations

Student coursework toward the Bachelor of Business Administration or Bachelor of Science described above may be augmented with one or more of the following specializations. Each specialization completed will be noted on the student’s academic transcript:

- Specialization in Business Aviation (p. 50)
- Specialization in Safety (p. 50)

All 300 and 400 level courses are restricted to Aviation majors, minors, or to students with instructor/departmental permission. All 400 level courses are restricted to junior/senior status.

* Career Electives are courses that students take to gain additional knowledge and skills that would allow them to develop their chosen career interest. A total of 12 credit hours are required from an approved list of Career Electives.
# A maximum combined limit of 6 credit hours of ATSC 397 Cooperative Education, and ATSC 497 Internship, may be used as Career Electives.
+ Grade of 'C' or higher required.
Courses

AVIT 100. Aviation Orientation. 1 Credit.
This course is required for all aviation majors. Its purpose is to prepare new students for their university and professional careers by discussing students' responsibilities and options concerning the aviation industry. Aviation career options will be explored. Academic and airport requirements and procedures will be covered. F,S.

AVIT 102. Introduction to Aviation. 5 Credits.
The course will develop the student's knowledge and skills that are needed to safely exercise the privileges and responsibilities of a Private Pilot. Course content includes instruction in aerodynamics, aircraft systems, FAA regulations, U.S. Airspace System, weight and balance, aircraft performance, aviation weather, flight publications, radio navigation, cross-country planning and navigation, basic flight physiology, and flight safety. The student must complete the appropriate flight lessons to satisfactorily complete the course. Prerequisites or Corequisites: ATSC 110 and a minimum GPA of 2.6. F,S,SS.

AVIT 103. Introduction to Air Traffic Management. 2 Credits.
This introductory course allows all aviation majors the opportunity to explore the Air Traffic Operations through the simulated role of an Air Traffic Controller in a Terminal RADAR Approach Control (TRACON) environment, or a Control Tower facility. This course follows the applicable required Federal Aviation Administration's learning objectives set forth in their Air Traffic Basics Course. Students will have a hands-on experience of working departures and arrivals in a simulated RADAR, or Tower, facility. They will be introduced to the Air Traffic Management System and National Airspace System, Navigational Aids, Separation Minima between Aircraft, and a general orientation to the world of Air Traffic Operations. This realistic look at the profession of an Air Traffic Controller will enhance any aviation enthusiast's dream of working air traffic. An Air Traffic lab is required. F,S,SS.

AVIT 105. Essentials of Flight. 3 Credits.
This course will provide the student with a survey of knowledge in both Visual Flight Rules and Instrument Flight Rules in aviation. F.

AVIT 126. Introduction to UAS Operations. 2 Credits.
This course of instruction introduces the student to the history of Unmanned Aircraft Systems and their current and future development for use in a burgeoning civil industry. Specific blocks deal with aircraft, ground, communications, launch and recovery systems while emphasizing the human integration into the overall system. F,S.

AVIT 142. Introduction to Aviation-Helicopter. 5 Credits.
This course develops the knowledge needed to safely exercise the privileges and responsibilities of a Private Pilot. Course content includes instruction in helicopter aerodynamics, helicopter systems, FAA regulations, U.S. airspace system, weight and balance, helicopter performance, aviation weather, flight publications, radio navigation, cross-country planning and navigation, basic flight physiology, and flight safety. Prerequisite: A minimum GPA of 2.6. Corequisite: AVIT 143. Prerequisite or Corequisite: ATSC 110 and ATSC 110L. F.

AVIT 143. Private Pilot-Helicopter Certification Lab. 1 Credit.
This lab course provides the training required to obtain a Private Pilot Certificate with Rotorcraft-Helicopter category and class ratings. The student will learn the fundamentals of helicopter flying, including aerodynamics, aeronautical decision making, emergency procedures and glass cockpit operations. Prerequisite: A minimum GPA of 2.6. Prerequisite or Corequisite: AVIT 142. S/U grading. F,S,SS.

AVIT 208. Aviation Safety. 3 Credits.
This course provides the student with a detailed introduction into aspects of aviation safety, aviation safety programs, risk management, and the associated components of pilot psychology, physiology, human factors, and accident review and investigation. Prerequisite: A minimum GPA of 2.6. Prerequisite or Corequisite: AVIT 102 or AVIT 142. F,S,SS.

AVIT 221. Basic Attitude Instrument Flying. 3 Credits.
This course begins with a discussion of Aeronautical Decision Making (ADM), Airworthiness Requirements for flight, Human Factors and night flight. The course proceeds to an in-depth study of pilot/stall and gyro instruments and Basic Attitude Instrument Flying. In addition, there will be a discussion of the operation, interpretation, and practical use of VOR, ADF, DME, GPS, RMI, and HSI, as well as an introduction to Electronic Instrument Flight Displays (Glass Flight Decks). The student must complete the appropriate flight lessons to satisfactorily complete the course. Prerequisite: AVIT 102 and a minimum GPA of 2.6. Prerequisite or Corequisite: AVIT 100. F,S,SS.

AVIT 222. IFR Regulations and Procedures. 3 Credits.
This course will provide the student with a detailed study of the regulations, procedures, and publications necessary for operating IFR in the national airspace system. Terminal and enroute procedures will be studied in detail. The student must complete the appropriate flight lessons to satisfactorily complete the course. Prerequisites: AVIT 221 and a minimum GPA of 2.6. Prerequisite or Corequisite: AVIT 208. F,S,SS.

AVIT 238. UAS Operator Certification. 3 Credits.
This course will develop the student's knowledge and skill needed to manage and operate small unmanned aircraft systems. Course content includes Federal Aviation Regulations, airspace authorization criteria, and operational approval requirements. Mission employment skills will be acquired through both classroom and hands-on flight activities. Flight activities will include launch and recovery operations, emergency procedures, plus mission planning and execution. Students must complete the appropriate UAS flight lessons to satisfactorily complete the course. Prerequisites: AVIT 126 and a minimum GPA of 2.6. F,S,SS.

AVIT 239. Autonomous Fundamentals. 2 Credits.
This course provides an overview of the current state of remotely piloted, unmanned, and autonomous systems and current commercially available systems. Moving beyond the constraints of aerial applications, the course will review common characteristics and features employed by autonomous systems across all domains (air, ground, and sea) while exploring the challenges of blending man and machine responses in dynamic operational environments. Prerequisites: AVIT 126 and a minimum GPA of 2.6. F.

AVIT 240. UAS Enabling Concepts. 3 Credits.
This course provides an in-depth survey of the enabling concepts critical to successful remotely piloted, unmanned aircraft, and autonomous system operations and provide the learner with an appreciation of the complexities of fully-realized autonomous system operations. Prerequisites: AVIT 239 and a minimum GPA of 2.6. S.

AVIT 241. Commercial Helicopter. 4 Credits.
This course provides a study of commercial helicopter systems, including turbine engines, drive trains, fuel, hydraulic, electrical, and basic flight instruments. Navigation aids, commercial regulations, and adverse helicopter aerodynamics will also be studied. Basic Attitude Instrument flying will be introduced and will include the interpretation and practical use of instrument navigation systems. Prerequisites: AVIT 142 and a minimum GPA of 2.6. Prerequisite or Corequisite: AVIT 100. S.

AVIT 242. Introduction to Commercial Flying-Helicopter Lab. 1 Credit.
This lab course is the beginning of a student's commercial helicopter flight training and is structured to improve and refine aeronautical decision making skills and aircraft control technique. The night flying experience requirements for a FAA Commercial Pilot certificate with Rotorcraft-Helicopter category and class ratings will also be obtained. Prerequisites: AVIT 142 and AVIT 143; Minimum GPA of 2.6. S/U grading. F,S,SS.

AVIT 247. R44 Helicopter Transition Lab. 1 Credit.
This lab course provides the training necessary to operate a Robinson R44 helicopter as pilot-in-command, including flight experience in the R44 helicopter. Prerequisite: Minimum GPA of 2.6. Prerequisite or Corequisite: AVIT 241. S/U grading. On demand.

AVIT 250. Human Factors. 2 Credits.
This course introduces the student to issues influencing human performance in the complex operational aviation environments. Theory and practical applications of cognitive processing, decision-making, interpersonal interaction and communication will be presented. This course also provides an introduction to design elements intended to optimize man-machine interaction. Prerequisite: Minimum GPA of 2.6. F,S,SS.

AVIT 260. Control Tower Operations I. 4 Credits.
The Control Tower Operations I provides an orientation to basic fundamental Clearance Delivery (CD) and Ground Control (GC) operations and procedures. Tower interaction with other Air Traffic and non-Air Traffic agencies is also part of this course. This course follows the applicable required Federal Aviation Administration's learning objectives set forth in their Air Traffic Basics Course. To complete this course, students must demonstrate their basic knowledge of the CD/GC function of Control Tower operations through written and performance examinations. An Air Traffic lab is required. Prerequisites: AVIT 103 and a minimum GPA of 2.6. Prerequisite or Corequisite: AVIT 100. F,S.
AVIT 261. RADAR Operations I. 4 Credits.
This course provides students with basic RADAR training and knowledge of separation requirements and procedures of Air Traffic Terminal RADAR Operations. Student evaluations are based on demonstrated application of acquired controller skills utilizing Air Traffic simulation. Scenarios progress in difficulty. This course follows the applicable required Federal Aviation Administration’s learning objectives set forth in their Air Traffic Basics Course. To complete this course, students must, in addition to normal academic requirements, successfully complete an intermediate RADAR simulation scenario without assistance. An Air Traffic lab is required. Prerequisites: AVIT 103 and a minimum GPA of 2.6. F, S, SS.

AVIT 276. OSHA Safety Standards for Industry. 3 Credits.
This course covers OSHA Standards, policies, and procedures in general industry. Topics include scope and application of the OSHA General Industry Standards, general industry principles and special emphasis on those areas in general industry, which are most hazardous. Prerequisite: Minimum GPA of 2.6. On demand.

AVIT 309. Flight Physiology. 3 Credits.
In this course, human physiological responses to the stresses of flight environment will be examined in-depth. Topics include decompression, hypoxia, spatial disorientation, altered pressure environments, acceleration and fatigue. The students will experience altered pressure environments during laboratory flights in the UND Aerospace altitude chamber. Prerequisites: AVIT 250; open to Aviation majors and minors only; minimum GPA of 2.6. F, S, SS.

AVIT 310. Public Safety Aviation. 3 Credits.
This course develops the student's knowledge related to the organization, operations, tactics and techniques related to air support operations within law enforcement, fire protection and resource protection agencies. Specific topics include: Airborne law enforcement patrol, surveillance and special operations (SWAT); fire operations including fire chemistry and behavior, fire department organization and tactics, airborne firefighting equipment, fire extinguishment tactics and air ambulance operations; and, resource protection air operations including wildlife surveys, hunting and fishing enforcement patrols, search and rescue and operations from unimproved landing sites and seaplane operations. Prerequisite: AVIT 102 or AVIT 142 or consent of instructor; minimum GPA of 2.6. S.

AVIT 311. Safety Management System (SMS). 3 Credits.
This course provides instruction and practical application of Safety Management Systems (SMS) and how SMS relates to Accident Prevention Program Management. Students receive the necessary instruction required to design, develop, implement, manage, and foster an effective organizational level SMS and accident prevention program. Course topics include theory and application of SMS program elements. Prerequisites: AVIT 208 and a minimum GPA of 2.6. S.

AVIT 312. Aircraft Accident Investigation. 3 Credits.
This course is a detailed evaluation of the methods and procedures involved in aircraft accident investigation including the organization, duties, and procedures of the Aircraft Accident Board. Prerequisites: AVIT 208, AVIT 250, and a minimum GPA of 2.6. S.

AVIT 313. Aviation Insurance. 3 Credits.
This course is an introduction to the basic principles of insurance and risk applicable to general aviation aircraft owners, fixed base operators, and airport management personnel. It includes an in-depth review of the aviation insurance industry in the United States, including market analysis and types of aviation insurers. Prerequisite: Minimum GPA of 2.6. F.

AVIT 320. Airline Career Planning. 2 Credits.
This course introduces the student to operations and quality of life issues related to working in a large flight department or air carrier environment. The material is not limited to one specific area of a professional pilot's career, but will seek to cover far reaching issues and provide the student with a wide perspective of what to expect as an airline pilot. Specific topics include: airline style interviews, training formats, working agreements, collective bargaining, bidding, scheduling, seniority, travel benefits, personal finance and other similar quality of life issues that will be encountered as a professional pilot. This course introduces the student to specific regulations pertaining to airline pilots, such as duty, rest and flight time restrictions. Prerequisites: AVIT 222 and a minimum GPA of 2.6. On demand.

AVIT 323. Aerodynamics - Airplanes. 3 Credits.
This course will provide the student a study of the physical principles of airplane aerodynamics, thereby fostering an appreciation of the factors affecting aircraft performance, stability and control, and special flight conditions often experienced by commercial pilots of fixed-wing aircraft. The student must complete the appropriate flight lessons to satisfactorily complete the course. Prerequisite: AVIT 222; open to Aviation majors and minors only; minimum GPA of 2.6. F, S, SS.

AVIT 324. Aircraft Systems. 3 Credits.
This course provides an in-depth study of reciprocating engine, propeller, electrical, environmental, hydraulic, pneumatic, fuel, ignition, lubrication, and pressurization systems. Prerequisite: Open to Aviation majors and minors only; minimum GPA of 2.6. Prerequisite or Corequisite: AVIT 221. F, S, SS.

AVIT 325. Multi-Engine Systems and Procedures. 2 Credits.
This course is designed to develop the knowledge and skills necessary to safely and proficiently exercise the privileges and responsibilities of a Commercial Pilot with a Multi-engine rating. Included are discussions concerning Aeronautical Decision Making of multi-engine aircraft systems, aerodynamics, Crew Resource Management, weight and balance, aircraft performance, and abnormal/emergency procedures. The course also includes a scenario based introduction to U.S. Title 14 Code of Federal Regulations (CFR) governing common carriage commercial operations. The student must complete the appropriate flight lessons to satisfactorily complete the course. Prerequisites: AVIT 323 and AVIT 324; open to Aviation majors and minors only; minimum GPA of 2.6. F, S, SS.

AVIT 327. Gas Turbine Engines. 2 Credits.
This course will provide an in-depth introduction to the turbine engine through the study of its development, theory of operation and the function of turbine engine components. Prerequisites: AVIT 142 or AVIT 324; open to Aviation majors and minors only; minimum GPA of 2.6. F, S, SS.

AVIT 331. UAS Flight Systems. 3 Credits.
This course of instruction introduces the student to the systems common to most Unmanned Aircraft with a focus on those that differ significantly from manned counterparts. Specific emphasis is placed upon autopilot systems and their integration with flight controls and airborne communications systems. Prerequisites: AVIT 126, AVIT 324, and a minimum GPA of 2.6. Corequisite: AVIT 332. F, S.

AVIT 332. UAS Ground Systems. 3 Credits.
This course introduces the student to those subsystems that comprise the unmanned aircraft system (UAS) ground control and mission planning system. The launch and recovery systems typical of current UAS are also covered. Prerequisites: AVIT 126, AVIT 324, and a minimum GPA of 2.6. F, S, SS.

AVIT 333. UAS Remote Sensing. 4 Credits.
This course presents the theory and operations of common sensors used by the operators of unmanned aircraft systems. Theory is combined with operational scenarios in order to provide the student with the ability to match specific sensors with anticipated missions. Prerequisites: AVIT 126, AVIT 324, and a minimum GPA of 2.6. F, S.

AVIT 337. Survey of Unmanned Aircraft Systems. 2 Credits.
Course content includes aircraft operating software, launch and recovery operations, payload operations, normal and emergency procedures, and mission planning and execution. It also includes a flight simulation component to provide exposure to the duties and responsibilities of UAS flight crew members but does not provide proficiency or certification on a specific UAS platform. Prerequisites: AVIT 102 and a minimum GPA of 2.6. F, S, SS.

AVIT 342. IFR Regulations and Procedures-Helicopter. 3 Credits.
This helicopter course provides a detailed study of the regulations, procedures, and publications necessary to operate a helicopter IFR in the national airspace system. Terminal and enroute procedures will be studied in detail. Prerequisite: AVIT 241 and a minimum GPA of 2.6. Prerequisite or Corequisite: AVIT 242. F, S.

AVIT 343. Instrument Rating-Helicopter Certification Lab. 1 Credit.
This lab course provides the training required to obtain an Instrument-Helicopter rating and to safely operate a helicopter as pilot-in-command under IFR in the national airspace system. It includes basic instrument flying, radio navigation, and glass cockpit procedures. Prerequisite: AVIT 242 and a minimum GPA of 2.6. Prerequisite or Corequisite: AVIT 342. S/U grading, F, S, SS.
AVIT 362. Advanced Tower Operations II. 4 Credits.
Students will build on the knowledge gained in AVIT 260 Control Tower Operations I. Utilizing the 3D tower simulator, the students are taught the basic, advanced, and fundamental Control Tower operations, including structure, procedures, theories of airspace/traffic management. This course follows the applicable required Federal Aviation Administration’s learning objectives set forth in their Air Traffic Basics Course. To complete this course, students will be required to demonstrate their basic knowledge of Control Tower operations through written examinations and performance scenarios in the 3D tower simulator. An Air Traffic lab. Prerequisites: AVIT 260 and a minimum GPA of 2.6. F,S.

AVIT 363. RADAR Operations II. 4 Credits.
This course provides students with advanced RADAR training and knowledge of separation requirements and procedures of Air Traffic Terminal RADAR operations. Using advanced Air Traffic techniques, uncontrolled airport, military, and emergency operations are introduced. Student evaluations are based on demonstrated application of acquired controller skills utilizing RADAR simulation. Scenarios progress in difficulty. This course follows the applicable required Federal Aviation Administration’s learning objectives set forth in their Air Traffic Basics Course. To complete this course, students must, in addition to normal academic requirements, successfully complete required advanced RADAR simulation scenarios without assistance. An Air Traffic lab is required. Prerequisites: AVIT 102 and AVIT 261; minimum GPA of 2.6. F,S.

AVIT 372. Global Perspectives in Aviation History. 3 Credits.
This course investigates aviation’s effects on global culture, commerce, and politics throughout its history by examining original historical sources and evidence from significant events in aviation. After taking this class, students will be more aware of their own and other cultural frameworks and biases and be able to use that perspective effectively as aviation professionals in a global industry. Prerequisite: Minimum GPA of 2.6. On demand.

AVIT 386. Conventional Aircraft Operations. 1 Credit.
Provides the necessary ground school and dual flight instruction for an endorsement for operation of tailwheel-type airplanes. Allows the student to acquire the knowledge and skills necessary for operation of the tailwheel aircraft on the ground and in flight. Prerequisites: AVIT 102; open to Aviation majors and minors only; minimum GPA of 2.6. S/U grading. F,SS.

AVIT 389. Introduction to Aerobatic Flight. 1 Credit.
To introduce, analyze and fly some of the more advanced flight maneuvers defined as aerobatics. Basic aerobatic maneuvers will be flown during the course including loops, spins, rolls, and inverted flight, with advanced variations and combinations of maneuvers demonstrated in flight. Prerequisite: AVIT 102; open to Aviation majors and minors only; minimum GPA of 2.6. S/U grading. F,SS.

AVIT 397. Cooperative Education. 1-2 Credits.
A practical work experience with an employer closely associated with the student’s academic area. Arranged by mutual agreement between student, aviation department, and employer. A maximum of four cooperative education credits may be applied toward the total credits needed to complete degree requirements. Co-op credits may not be substituted for any required course within the student’s major. Prerequisites: Acceptance into a co-op position with cooperating industry and approval of the aviation department; open to aviation majors and minors only. Repeatable to 8 credits. S/U grading. F,SS.

AVIT 399. Special Aerospace Topics. 1-12 Credits.
Special Aerospace Topics. Prerequisites: AVIT 102; open to Aviation majors and minors only; minimum GPA of 2.6. Repeatable to 12 credits. S/U grading. F,SS.

AVIT 402. Airport Planning and Administration. 3 Credits.
This is the first of a two course curriculum in airport administration. This initial course provides an introduction to the complex elements of airport planning and its importance in achieving a successful airport operation. Course content includes a study of the duties and responsibilities of the airport manager with a special emphasis on the Federal Air Regulations governing the operation and administration of commercial service airports within the United States. Prerequisites: Junior or Senior status, open to Aviation majors and minors only, and a minimum GPA of 2.6. F,S.

AVIT 403. Aerospace Law. 3 Credits.
This course is designed to introduce the student to the United States legal system and the development of air law. The course will cover a broad range of topics related to aviation operations including constitutional law, administrative law, Federal Aviation Administration enforcement actions, aircraft ownership issues, products liability law, criminal law, contract law, and international law. Course activities include case reading, argument, and legal research. Prerequisites: Junior or Senior status, open to Aviation majors and minors only, and a minimum GPA of 2.6. F,S,SS.

AVIT 405. Airline Operations and Management. 3 Credits.
This course examines the four major areas of air carrier operations, including ground, technical, flight and system operations, as well as airline economics, utilizing a management simulation tool. There is an intensive examination of regional, point-to-point and network carrier operations. Student management teams make weekly decisions in seven categories: Overall Strategy; Marketing; Operations Management; Human Resource Development; Finance; Asset Management; and Behavioral Elements. A portion of each class time is devoted to simulation activities, and the reading assignments focus on management decisions pertinent to the topic assigned, relying in part on current industry events, with an emphasis on ethical decision making. Prerequisites: Junior or Senior status, open to Aviation majors and minors only, and a minimum GPA of 2.6. F,S,SS.

AVIT 407. General Aviation Operations and Management. 3 Credits.
Aspects of the operation and management of corporate flight departments, fixed-base operations, air cargo operations, and fractional ownership programs will be discussed. Pertinent regulations including FAR parts 91 and 135 will be studied. Aircraft and equipment evaluations will be conducted. Prerequisites: Junior or Senior status, open to Aviation majors and minors only, and a minimum GPA of 2.6. F,S,SS.

AVIT 408. Fleet Planning and Aircraft Acquisition. 4 Credits.
This course will analyze the needs and missions of various business flight departments, provide insight into aircraft selection, and explore the details of aircraft acquisition. A broad range of issues will be discussed, including finance options, insurance coverage, and fleet management. Prerequisites: AVIT 102 or AVIT 142; AVIT 407, and a minimum GPA of 2.6. F.

AVIT 411. International and Long Range Navigation. 3 Credits.
This course provides an understanding of global charting systems, great circle routes and waypoint plotting. Problems and methods of international flight and modern systems of long range navigation are studied as well as methods and systems of computing, communicating and displaying navigation information. This course also gives the student a familiarization with the international airspace structure including Required Navigation Performance (RNP) standards, Minimum Navigation Performance Specification (MNPS) operations and Reduced Vertical Separation Standards (RVSM). Prerequisites: AVIT 241 or AVIT 325; open to aviation majors and minors only; minimum GPA of 2.6. F.

AVIT 412. Aviation Safety Analysis. 3 Credits.
This course will examine the various techniques and processes used to assess and predict organizational risk as it pertains to aviation operations. The role of quality assurance within a Safety Management System (SMS) will be also explored. An introduction to specific aviation safety assurance programs will be conducted and will include safety surveys and formalized observations. Prerequisites: AVIT 311 and a minimum GPA of 2.6. S.

AVIT 414. Certified Flight Instructor Certification. 5 Credits.
Provides the student with a detailed study of the responsibilities and teaching concerns of a flight instructor. The course is divided into two major sections: fundamentals of teaching and learning, including effective teaching methods, learning process, consideration of flight training syllabi, effective evaluations, and flight instructor responsibilities; the second section is concerned with the analysis of the flight maneuvers involved with Private Pilot, Commercial Pilot and Flight Instructor Certificates. The course will also provide practical teaching experiences. The student must complete the associated flight lessons in the CFI Flight Course to satisfactorily complete the course. Prerequisites: AVIT 325 and Junior or Senior status; open to Aviation majors and minors only; minimum GPA of 2.6. F,S,SS.
AVIT 415. Instrument Flight Instructor. 4 Credits.
Provides the student with an in-depth study of the responsibilities and techniques to be used as an Instrument Flight Instructor. This course will also include additional study of instrument flight, charts, publications and regulations pertaining to the IFR environment, further develop the student's knowledge of Technically Advanced Aircraft and provide practical teaching experience. The student must complete the associated flight lessons in the Instrument Flight Instructor course to satisfactorily complete the course. Prerequisites: AVIT 414 and Junior or Senior status; open to Aviation majors and minors only; minimum GPA of 2.6. F, S, SS.

AVIT 416. Multi-Engine Flight Instructor. 2 Credits.
This course provides an understanding of the fundamentals of teaching in a multi-engine airplane. The course will include multi-engine aerodynamics and performance, analysis of multi-engine operations, multi-engine operations and procedures, flight instructor responsibilities, flight safety concerns and instrument flight maneuvers in multi-engine airplanes. The student must complete the associated flight lessons in the Multi-engine Airplane CFI course to satisfactorily complete the course. Prerequisites: AVIT 415 and Junior or Senior status; open to Aviation majors and minors only; minimum GPA of 2.6. F, S, SS.

AVIT 419. SUAS Commercial Operations. 4 Credits.
This course will develop the student's knowledge and skill needed to manage and operate small unmanned aircraft systems in a commercial operation. Course content includes airspace authorization criteria, operational approval requirements, mission planning, data acquisition, and post processing of data. Mission employment skills will be acquired through both classroom and hands-on flight activities. Flight activities will include scenario based mission planning and execution. Students must complete the appropriate UAS flight lessons to satisfactorily complete the course. Prerequisites: AVIT 222, AVIT 331, AVIT 332, AVIT 333, AVIT 337 and a minimum GPA of 2.6. F, S.

AVIT 421. Advanced Aerodynamics. 3 Credits.
Beginning with a brief review of low speed aerodynamics, the course provides a study of the terminology and aerodynamics fundamentals associated with transonic and supersonic flight. Prerequisites: AVIT 325 and Junior or Senior status or consent of the instructor; open to aviation majors and minors only; minimum GPA of 2.6. F, S, SS.

AVIT 428. Transport Category Aircraft Systems. 4 Credits.
This course provides an in-depth study of the complex systems of today's air transport jet aircraft with an emphasis on the Canadair Regional Jet aircraft. It provides a review of all primary systems, to include both normal and abnormal operations. The course also provides the necessary background for Regional Jet simulator training to be presented in a later course. A course fee is charged for access to the Canadair Regional Jet virtual flight deck. Prerequisites: AVIT 325 and Junior or Senior status; open to Aviation majors and minors only; minimum GPA of 2.6. F, S, SS.

AVIT 429. Turboprop Operations. 4 Credits.
This course will provide an introduction to turboprop aircraft systems and procedures. Emphasis will be placed on the systems and operational procedures for a specific model of turboprop aircraft utilized by regional airlines. Course content and presentation will be similar to air carrier initial training. The course will provide a synopsis of the turboprop industry including any recent developments. Prerequisites: AVIT 325 and Junior or Senior status; open to Aviation majors and minors only; minimum GPA of 2.6. F, S, SS.

AVIT 430. Crew Resource Management. 3 Credits.
This course will provide an in-depth study of Crew Resource Management which involves having a thorough understanding of crew communications, teamwork, leadership, "followership," decision-making, and situational awareness. In addition, the student will learn how to properly utilize all available resources in order to conduct a safe and efficient flight. This course will also examine the benefits of diversity, and the role diversity plays in the modern aerospace industry. Prerequisites: AVIT 250 and either AVIT 342 or AVIT 325; Junior or Senior status; open to Aviation majors and minors only; minimum GPA of 2.6. F, S.

AVIT 438. UAS Operations. 4 Credits.
This course of instruction will develop the student's knowledge and skills that are needed to safely employ unmanned aircraft systems. Course content includes aircraft operating software, launch and recovery operations, payload operations, normal and emergency procedures, and mission planning and execution. Specific emphasis will be placed upon aircraft and payload selection based upon proposed mission analysis. Students must complete the appropriate flight lessons to satisfactorily complete the course. Prerequisites: AVIT 126, AVIT 325, AVIT 331, AVIT 332, AVIT 337 and a minimum GPA of 2.6. F, S, SS.

AVIT 442. Airport Operations and Administration. 3 Credits.
This course is the second of a two course curriculum in airport administration. It is an advanced course emphasizing the further development of the skills and understanding of the operation and management of commercial service airports of all sizes. The content focuses upon the practical application of airport manager skills and includes educational tours of operating airports. The course stresses the airport manager's role in relations with tenants, public officials, and patrons through the honing of individual writing and public speaking skills. Prerequisites: AVIT 402 and Junior or Senior status; open to Aviation majors and minors only; minimum GPA of 2.6. S.

AVIT 444. Helicopter Advanced Operations. 4 Credits.
This course provides advanced study of helicopter aerodynamics and performance as applied to commercial helicopter operations in varying extreme environmental field conditions, including mountain, off-shore (salt water), desert, arctic and tropical operations. Specific helicopter missions are studied, including agriculture, long-line, off-shore and night vision goggle operations. Prerequisite: AVIT 241 and AVIT 242; minimum GPA of 2.6. F.

AVIT 445. Commercial Pilot-Helicopter Certification Lab. 1 Credit.
This lab course is a continuation of commercial helicopter flight training and is completed after the student has obtained the Instrument-Helicopter rating. This course further refines the aeronautical decision making and flight proficiency skills necessary to obtain the Commercial Pilot Rotorcraft-Helicopter rating. Prerequisite: AVIT 343 and a minimum GPA of 2.6. S/U grading. F, S, SS.

AVIT 450. Counter UAS Applications. 3 Credits.
Counter UAS application is designed to educate and explore the emerging threat of unmanned aircraft systems to the nation's airspace and infrastructure. This course will be divided into four sections (overview, detect, identify and defeat), to cover all current and future lines of effort in a unified approach to counter UAS. Prerequisites: AVIT 240 and a minimum GPA of 2.6. F.

AVIT 464. Control Tower/Radar Operations III. 4 Credits.
This course teaches advanced tower and RADAR operations and procedures combined. Students will learn about and practice military overhead maneuvers, arrivals and departures from uncontrolled airports, below Basic VFR minima operations, IFR operations, nighttime operations, in-flight and ground emergencies, bomb threat procedures, and special operations (runway incursions, hot cargo, and hijacking) procedures. This course follows the applicable required Federal Aviation Administration's learning objectives set forth in their Air Traffic Basics Course. To complete this course, students must demonstrate their knowledge of the preceding Control Tower and RADAR courses, in addition to this course's content. An Air Traffic lab is required. Prerequisites: AVIT 362, AVIT 363, and Junior or Senior status; open to aviation majors and minors only; minimum GPA of 2.6. F, S, SS.

AVIT 465. Control Tower/RADAR Operations IV. 4 Credits.
This is the capstone course for the Air Traffic Management program focusing on the interaction between the Tower, Terminal RADAR, and Enroute Facilities. The course provides students with highly advanced instruction on the ATM system, publications, Federal Aviation Regulations, separation standards, airspace utility, aircraft types and characteristics, fundamentals of navigation, pilot's environment, flight assistance and emergencies, special operations, wake turbulence, weather, communications, and teamwork. Instruction is delivered through classroom lecture, group discussions and scenarios with hands-on practice. This course follows the applicable required Federal Aviation Administration's learning objectives set forth in their Air Traffic Basics Course. To complete this course, students must successfully complete the FAA AT Basic Exam and the required advanced simulation scenarios without assistance. An Air Traffic lab is required. Prerequisites: AVIT 464 and Junior or Senior status; open to aviation majors and minors only; minimum GPA of 2.6. F, S, SS.
AVIT 468. Non-RADAR Environment. 4 Credits.
This course stresses the comprehensive knowledge of non-RADAR Air Traffic procedures, to include: airspace utilization, flight plans, general control procedures, board management, initial departure separation, IFR clearances to departing aircraft, communication requirements, and separation standards. Class scenarios will emphasize both enroute and terminal structures. This course follows the applicable required Federal Aviation Administration’s learning objectives set forth in their Air Traffic Basics Course. To complete this course, the student shall be required to demonstrate and apply the skills and knowledge required to successfully complete a non-RADAR performance exercise. An Air Traffic lab is required. Prerequisites: AVIT 415, AVIT 421, AVIT 428, and Junior or Senior status; open to aviation majors and minors only; minimum GPA of 2.6. F.S.SS.

AVIT 476. Risk Management. 3 Credits.
Risk Management. Prerequisite: Minimum GPA of 2.6. On demand.

AVIT 480. Advanced Aircraft Operations. 3 Credits.
The topics of study include high speed and high altitude aerodynamics, physiological aspects of high altitude flight, considerations associated with operations near high speed buffet boundaries, effects of turbulence on high speed aircraft, the effects of maneuvering load factors, FAR Part 25 takeoff and landing performance, along with the general study of applied systems management. The student must complete the associated flight lessons to satisfactorily complete the course. No concurrent enrollment allowed with other aviation flight courses. Prerequisites: AVIT 415, AVIT 421, AVIT 428, and Junior or Senior status; open to aviation majors and minors only; minimum GPA of 2.6. F.S.SS.

AVIT 485. Aviation Senior Capstone. 3 Credits.
This course will explore contemporary and ethical issues in the aviation industry. Students will work in multi-disciplinary teams to examine and solve issues related to global aviation, environmental concerns, technology advances, aviation safety and security practices, labor issues and aviation economics. Students will be required to demonstrate an understanding of information literacy and advanced communications through coursework. Prerequisites: AVIT 403, senior status, and a minimum GPA of 2.6. F.S.

AVIT 490. Methods and Materials in Teaching Aviation I. 2 Credits.
This course will acquaint the student with resources and software used in classroom teaching specific to aviation. Topics covered include teaching with technology, utilizing instructional aids, motivating students, marketing a program and a career exploration in aviation education. Students will also gain the experience of managing the Aerospace Learning Center. Prerequisite: AVIT 414 or consent of instructor; open to Aviation majors and minors only; minimum GPA of 2.6. Repeatable to 6 credits. On demand.

AVIT 491. Methods and Materials in Teaching Aviation II. 2 Credits.
This course will be a continuation of the work started in Aviation 490 by providing the student with additional opportunities in the use of resources and software used in classroom teaching specific to aviation. Additional emphasis will be placed on the development of course syllabi and lesson plans, delivering classroom lessons, and the critique, evaluation, and assessment of student and instructor performance. Students will also gain the experience of managing the Aerospace Learning Center. Prerequisites: AVIT 414 and Junior or Senior status or consent of instructor; open to Aviation majors and minors only; minimum GPA of 2.6. On demand.

AVIT 497. Aviation Internship. 1-4 Credits.
Aviation internship will provide a student with the actual, on-the-job exposure of a particular area of interest the student has within the aviation industry. Internships will be available in airport management, general aviation management, on both the manufacturer and fixed-base operator level and within the weather modification industry. The weather modification internship will be available only with the necessary federal funding or contractor support. A maximum of 4 credits will be allowed toward graduation. Prerequisites will vary depending on the area of the internship. Prerequisites: Junior or senior standing with a minimum GPA of 2.6 required; open to Aviation majors and minors only; prerequisites will vary depending on the area of the internship. Repeatable to 6 credits. F.S.SS.

AVIT 498. Advanced UAS Operations. 1-3 Credits.
This course is designed to develop advanced knowledge and skill in a specific area of expertise in UAS operations such as Original Equipment Manufacturer (OEM) certification, industry certifications, or special training on Autonomous platforms, payloads, and support equipment. Prerequisites: AVIT 438 or AVIT 419; a minimum GPA of 2.6. Repeatable to 6 credits. On demand.

AVIT 499. Readings in Aviation. 1-3 Credits.
Individual student projects designed to develop advanced knowledge in a specific area of expertise. A written report is required. Prerequisites: Senior standing; open to aviation majors and minors only; minimum GPA of 2.6. Repeatable to 8 credits. F.S.SS.

Bachelor of Science in Aeronautics with a Major in Air Traffic Management

NOTE: This program has a selective admission process. See your adviser for information.

Required: 120 credits (36 of which must be numbered 300 or above) including:

I. Essential Studies Requirements (see University ES listing).
II. School of Aerospace Sciences Requirements (see College section).
III. The following curriculum:

### Essential Studies Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ENGL 110</td>
<td>College Composition I</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 130</td>
<td>Composition II: Writing for Public Audiences</td>
<td>3</td>
</tr>
<tr>
<td>COMM 110</td>
<td>Fundamentals of Public Speaking</td>
<td>3</td>
</tr>
<tr>
<td>Social Science Electives</td>
<td>9</td>
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<tr>
<td>Fine Arts and Humanities Electives</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>ATSC 110</td>
<td>Meteorology I</td>
<td>3</td>
</tr>
<tr>
<td>ATSC 110L</td>
<td>Meteorology I Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>MATH 103</td>
<td>College Algebra</td>
<td>3</td>
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<tr>
<td>Math, Science, and Technology Elective</td>
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</table>

### Aviation Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AVIT 100</td>
<td>Aviation Orientation</td>
<td>1</td>
</tr>
<tr>
<td>AVIT 102</td>
<td>Introduction to Aviation</td>
<td>5-6</td>
</tr>
<tr>
<td>or AVIT 142 &amp; AVIT 143</td>
<td>Introduction to Aviation-Helicopter and Private Pilot-Helicopter Certification Lab</td>
<td>4</td>
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<tr>
<td>AVIT 103</td>
<td>Introduction to Air Traffic Management</td>
<td>2</td>
</tr>
<tr>
<td>AVIT 126</td>
<td>Introduction to UAS Operations</td>
<td>2</td>
</tr>
<tr>
<td>AVIT 208</td>
<td>Aviation Safety</td>
<td>3</td>
</tr>
<tr>
<td>AVIT 250</td>
<td>Human Factors</td>
<td>2</td>
</tr>
<tr>
<td>AVIT 260</td>
<td>Control Tower Operations I</td>
<td>4</td>
</tr>
<tr>
<td>AVIT 361</td>
<td>RADAR Operations I</td>
<td>4</td>
</tr>
<tr>
<td>AVIT 362</td>
<td>Advanced Tower Operations II</td>
<td>4</td>
</tr>
<tr>
<td>AVIT 363</td>
<td>RADAR Operations II</td>
<td>4</td>
</tr>
<tr>
<td>AVIT 402</td>
<td>Airport Planning and Administration</td>
<td>3</td>
</tr>
<tr>
<td>AVIT 403</td>
<td>Aerospace Law</td>
<td>3</td>
</tr>
<tr>
<td>AVIT 464</td>
<td>Control Tower/Radar Operations III</td>
<td>4</td>
</tr>
<tr>
<td>AVIT 465</td>
<td>Control Tower/Radar Operations IV</td>
<td>4</td>
</tr>
<tr>
<td>AVIT 468</td>
<td>Non-RADAR Environment</td>
<td>4</td>
</tr>
<tr>
<td>AVIT 485</td>
<td>Aviation Senior Capstone</td>
<td>3</td>
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</tbody>
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### Other Requirements

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>COMM 212</td>
<td>Interpersonal Communication</td>
<td>3</td>
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<tr>
<td>MGMT 300</td>
<td>Principles of Management</td>
<td>3</td>
</tr>
<tr>
<td>or AVIT 311</td>
<td>Safety Management System (SMS)</td>
<td>3</td>
</tr>
<tr>
<td>or AVIT 312</td>
<td>Aircraft Accident Investigation</td>
<td>3</td>
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</table>

Select one of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BADM 225</td>
<td>Professional Communication for Business</td>
<td>3</td>
</tr>
<tr>
<td>or ENGL 228</td>
<td>Diversity in Global Literatures</td>
<td>3</td>
</tr>
<tr>
<td>or ENGL 229</td>
<td>Diversity in U.S. Literatures</td>
<td>3</td>
</tr>
<tr>
<td>or ENGL 308</td>
<td>The Art of Writing Nonfiction</td>
<td>3</td>
</tr>
</tbody>
</table>

Plus electives to total 120 credits. **22-23**

### Total Credits

120
The following curriculum:

II. School of Aerospace Sciences Requirements (see College section).

I. Essential Studies Requirements (see University ES listing).

Required: 120 credits (36 of which must be numbered 300 or above) including:

- Related technical programs.
- Operator License or Radar Rating, or equivalent levels of certification in other related technical programs.
- Dispatcher License; FAA Commercial Pilot License; FAA Certified Tower Operator License or Radar Rating, or equivalent levels of certification in other related technical programs.
- Admission to this program requires the successful completion of an approved aviation technical program, with certification. Examples of approved technical certifications include: FAA Mechanic Certificate with Airframe and Powerplant ratings; FCC General Class Radio and Telephone License; FAA Aircraft Dispatcher License; FAA Commercial Pilot License; FAA Certified Tower Operator License or Radar Rating, or equivalent levels of certification in other related technical programs.

Required: 120 credits (36 of which must be numbered 300 or above) including:

I. Essential Studies Requirements (see University ES listing).

II. School of Aerospace Sciences Requirements (see College section).

III. The following curriculum:

- ATSC 110 Meteorology I 3
- ATSC 110L Meteorology I Laboratory 1
- COMM 110 Fundamentals of Public Speaking 3
- ENGL 110 College Composition I 3
- ENGL 130 Composition II: Writing for Public Audiences 3
- MATH 103 College Algebra 3
- Fine Arts & Humanities 9
- Math, Science, and Technology 2
- Social Science 9

Aviation Requirements

AVIT 100 Aviation Orientation 1
AVIT 102 Introduction to Aviation 5

OR

AVIT 142 Introduction to Aviation-Helicopter & AVIT 143 and Private Pilot-Helicopter Certification Lab 6

OR

AVIT 105 Essentials of Flight 2
AVIT 103 Introduction to Air Traffic Management 2
AVIT 126 Introduction to UAS Operations 2
AVIT 208 Aviation Safety 3
AVIT 250 Human Factors 2
AVIT 403 Aerospace Law 3
AVIT 485 Aviation Senior Capstone 3

Select two of the following:

AVIT 402 Airport Planning and Administration 6
AVIT 405 Airline Operations and Management 6
AVIT 407 General Aviation Operations and Management 6

OTHER REQUIREMENTS

Select 30 credits from the following:

AVIT 310 Public Safety Aviation 5
AVIT 311 Safety Management System (SMS) 5
AVIT 312 Aircraft Accident Investigation 5
AVIT 313 Aviation Insurance 5
AVIT 408 Fleet Planning and Aircraft Acquisition 5
AVIT 412 Aviation Safety Analysis 5
ISBC 117 Personal Productivity with Information Technology 5
ISBC 217 Fundamentals of Computer Information Systems 5
BADM 225 Professional Communication for Business 5
MGMT 300 Principles of Management 5

Mgmt 301 Operations Management 3
MGMT 302 Human Resource Management 3
MGMT 310 Organizational Behavior 3

Plus electives to total 120 credits

Bachelor of Science in Aeronautics with a Major in Commercial Aviation

Required: 120 credits (36 of which must be numbered 300 or above) including:

I. Essential Studies Requirements (see University ES listing).

II. School of Aerospace Sciences Requirements (see College section).

III. The following curriculum:

Essential Studies Courses

ENGL 110 College Composition I 3
ENGL 130 Composition II: Writing for Public Audiences 3
COMM 110 Fundamentals of Public Speaking 3
Social Science Electives 9
Fine Arts and Humanities Electives 9
ATSC 110 Meteorology I 3
ATSC 110L Meteorology I Laboratory 1
MATH 103 College Algebra 3
Math, Science, and Technology Elective 2

Aviation Core Courses

AVIT 100 Aviation Orientation 1
AVIT 103 Introduction to Air Traffic Management 2
AVIT 126 Introduction to UAS Operations 2
AVIT 208 Aviation Safety 3
AVIT 250 Human Factors 2
AVIT 309 Flight Physiology 3
AVIT 327 Gas Turbine Engines 2
AVIT 403 Aerospace Law 3
AVIT 430 Crew Resource Management 3
AVIT 485 Aviation Senior Capstone 3

Select two of the following:

AVIT 402 Airport Planning and Administration 4
AVIT 405 Airline Operations and Management 4
AVIT 407 General Aviation Operations and Management 4

Other Requirements

ATSC 231 Aviation Meteorology 4

Select one of the following:

ENGL 227 Introduction to Literature and Culture 3
or ENGL 228 Diversity in Global Literatures 3
or ENGL 229 Diversity in U.S. Literatures 3
or ENGL 308 The Art of Writing Nonfiction 3
or BADM 225 Professional Communication for Business 3

Required Courses - Airplane Option

AVIT 102 Introduction to Aviation 5
AVIT 221 Basic Attitude Instrument Flying 3
AVIT 222 IFR Regulations and Procedures 3
AVIT 323 Aerodynamics - Airplanes 3
AVIT 324 Aircraft Systems 3
AVIT 325 Multi-Engine Systems and Procedures 2
AVIT 414 Certified Flight Instructor Certification 5
AVIT 415 Instrument Flight Instructor 4
AVIT 421 Advanced Aerodynamics 3
AVIT 428 Transport Category Aircraft Systems 4

* Students will be required to use their electives to establish expertise in a second field, which means completion of a second major, a minor, a specialization, or other degree sub-plans. The Aviation Department may be consulted to discuss other sub-plan options.
II. School of Aerospace Sciences Requirements (see College section).

I. Essential Studies Requirements (see University ES listing).

Required: 120 credits (36 of which must be numbered 300 or above) including:

**Aviation Courses**

AVIT 142 Introduction to Aviation-Helicopter 5
AVIT 143 Private Pilot-Helicopter Certification Lab 1
AVIT 241 Commercial Helicopter 4
AVIT 242 Introduction to Commercial Flying-Helicopter Lab 1
AVIT 247 R44 Helicopter Transition Lab 1
AVIT 310 Public Safety Aviation 3
AVIT 342 IFR Regulations and Procedures-Helicopter 3
AVIT 343 Instrument Rating-Helicopter Certification Lab 1
AVIT 444 Helicopter Advanced Operations 4
AVIT 445 Commercial Pilot-Helicopter Certification Lab 1

One of the Following Courses for the Helicopter Option (1-5 Credits)

AVIT 445

AVIT 414
AVIT 311

AVIT 415

AVIT 480

**Required Courses - Helicopter Option**

AVIT 490 Advanced Aircraft Operations 3

**Methods and Materials in Teaching Aviation I** 2

**Bachelor of Science in Aeronautics with a Major in Flight Education**

Required: 120 credits (36 of which must be numbered 300 or above) including:

I. Essential Studies Requirements (see University ES listing).

II. School of Aerospace Sciences Requirements (see College section).

III. The following curriculum:

**Essential Studies Courses**

ENGL 110 College Composition I 3
ENGL 130 Composition II: Writing for Public Audiences 3
COMM 110 Fundamentals of Public Speaking 3
PSYC 111 Introduction to Psychology 3

Social Science Elective 6

Fine Arts and Humanities Elective 9
ATSC 110 Meteorology I 3
ATSC 110L Meteorology I Laboratory 1
MATH 103 College Algebra 3

Math, Science, and Technology Elective 2

**Aviation Courses**

AVIT 100 Aviation Orientation 1
AVIT 102 Introduction to Aviation 5
AVIT 103 Introduction to Air Traffic Management 2
AVIT 126 Introduction to UAS Operations 2
AVIT 208 Aviation Safety 3
AVIT 221 Basic Attitude Instrument Flying 3
AVIT 222 IFR Regulations and Procedures 3
AVIT 250 Human Factors 2
AVIT 309 Flight Physiology 3
AVIT 323 Aerodynamics - Airplanes 3
AVIT 324 Aircraft Systems 3
AVIT 325 Multi-Engine Systems and Procedures 2
AVIT 403 Aerospace Law 3
AVIT 405 Airline Operations and Management 3
AVIT 407 General Aviation Operations and Management 3
AVIT 414 Certified Flight Instructor Certification 5
AVIT 415 Instrument Flight Instructor 4
AVIT 416 Multi-Engine Flight Instructor 2
AVIT 485 Aviation Senior Capstone 3
AVIT 490 Methods and Materials in Teaching Aviation I 2

**Other Requirements**

AVIT 491 Methods and Materials in Teaching Aviation II 2

**Bachelor of Science in Aeronautics with a Major in Unmanned Aircraft Systems Operations**

Required: 120 credits (36 of which must be numbered 300 or above) including:

I. Essential Studies Requirements (see University ES listing).

II. School of Aerospace Sciences Requirements (see College section).

III. The following curriculum:

**Essential Studies Courses**

ENGL 110 College Composition I 3
ENGL 130 Composition II: Writing for Public Audiences 3
COMM 110 Fundamentals of Public Speaking 3

Social Science Electives 9
Fine Arts and Humanities Electives 9
ATSC 110 Meteorology I 3
ATSC 110L Meteorology I Laboratory 1
MATH 103 College Algebra 3
CSCI 130 Introduction to Scientific Programming 4
OR
CSCI 160 Computer Science I 4
CSCI 290 Cyber-Security and Information Assurance 3

**Other Requirements**

ATSC 231 Aviation Meteorology 4

Select one of the following:

ENGL 227 Introduction to Literature and Culture 3
ENGL 228 Diversity in Global Literatures 3
ENGL 229 Diversity in U.S. Literatures 3
ENGL 308 The Art of Writing Nonfiction 3
BADM 225 Professional Communication for Business 3

**Aviation Courses**

AVIT 100 Aviation Orientation 1
AVIT 102 Introduction to Aviation 5
AVIT 103 Introduction to Air Traffic Management 2
AVIT 126 Introduction to UAS Operations 2
AVIT 208 Aviation Safety 3
AVIT 221 Basic Attitude Instrument Flying 3
AVIT 222 IFR Regulations and Procedures 3
AVIT 250 Human Factors 2
AVIT 309 Flight Physiology 3
AVIT 323 Aerodynamics - Airplanes 3
AVIT 324 Aircraft Systems 3
AVIT 325 Multi-Engine Systems and Procedures 2
AVIT 403 Aerospace Law 3
AVIT 405 Airline Operations and Management 3
AVIT 407 General Aviation Operations and Management 3
AVIT 414 Certified Flight Instructor Certification 5
AVIT 415 Instrument Flight Instructor 4
AVIT 416 Multi-Engine Flight Instructor 2
AVIT 485 Aviation Senior Capstone 3
AVIT 490 Methods and Materials in Teaching Aviation I 2

University of North Dakota
Minor in Aviation Management

Required: 21 credits including:

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<tr>
<td>ATSC 110</td>
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<tr>
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<tr>
<td>AVIT 102</td>
<td>Introduction to Aviation</td>
<td>5</td>
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<tr>
<td>or AVIT 142</td>
<td>Introduction to Aviation-Helicopter</td>
<td></td>
</tr>
<tr>
<td>&amp; AVIT 143</td>
<td>and Private Pilot-Helicopter Certification Lab</td>
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</tr>
<tr>
<td>AVIT 208</td>
<td>Aviation Safety</td>
<td>3</td>
</tr>
<tr>
<td>AVIT 402</td>
<td>Airport Planning and Administration</td>
<td>3</td>
</tr>
<tr>
<td>AVIT 403</td>
<td>Aerospace Law</td>
<td>3</td>
</tr>
<tr>
<td>AVIT 405</td>
<td>Airline Operations and Management</td>
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<tr>
<td>or AVIT 407</td>
<td>General Aviation Operations and Management</td>
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<tr>
<td>Total Credits</td>
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Minor in Professional Flight

Required: 30 credits including:

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<tbody>
<tr>
<td>ATSC 110</td>
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<td>ATSC 110L</td>
<td>Meteorology I Laboratory</td>
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<td>ATSC 231</td>
<td>Aviation Meteorology</td>
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<td>AVIT 102</td>
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<td>AVIT 208</td>
<td>Aviation Safety</td>
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<td>AVIT 221</td>
<td>Basic Attitude Instrument Flying</td>
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<td>AVIT 222</td>
<td>IFR Regulations and Procedures</td>
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<td>AVIT 323</td>
<td>Aerodynamics - Airplanes</td>
<td>3</td>
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<td>AVIT 324</td>
<td>Aircraft Systems</td>
<td>3</td>
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<tr>
<td>AVIT 325</td>
<td>Multi-Engine Systems and Procedures</td>
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<tr>
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Minor in Unmanned Aircraft Systems

Required 20 credits including:

Required 8 credits:

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<td>AVIT 126</td>
<td>Introduction to UAS Operations</td>
<td>2</td>
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<tr>
<td>AVIT 238</td>
<td>UAS Operator Certification</td>
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<tr>
<td>CSCI 290</td>
<td>Cyber-Security and Information Assurance</td>
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Remaining 12 credits from:

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<td>ATSC 110</td>
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</tr>
<tr>
<td>ATSC 110L</td>
<td>Meteorology I Laboratory</td>
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Safety Specialization

Required 18 credits including:

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<tr>
<td>AVIT 276</td>
<td>OSHA Safety Standards for Industry</td>
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<tr>
<td>AVIT 311</td>
<td>Safety Management System (SMS)</td>
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<tr>
<td>AVIT 312</td>
<td>Aircraft Accident Investigation</td>
<td>3</td>
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<tr>
<td>AVIT 313</td>
<td>Aviation Insurance</td>
<td>3</td>
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<tr>
<td>AVIT 412</td>
<td>Aviation Safety Analysis</td>
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<tr>
<td>CSCI 290</td>
<td>Cyber-Security and Information Assurance</td>
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Specialization in Business Aviation

Required Courses (16 credits) including:

<table>
<thead>
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<td>AVIT 311</td>
<td>Safety Management System (SMS)</td>
<td>3</td>
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<tr>
<td>AVIT 313</td>
<td>Aviation Insurance</td>
<td>3</td>
</tr>
<tr>
<td>AVIT 407</td>
<td>General Aviation Operations and Management</td>
<td>3</td>
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<tr>
<td>AVIT 408</td>
<td>Fleet Planning and Aircraft Acquisition</td>
<td>4</td>
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<tr>
<td>ENTR 386</td>
<td>Financials for Entrepreneurs</td>
<td>3</td>
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<td>Total Credits</td>
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</table>

Banking and Financial Economics

(See Economics (p. 82) listing)
Biochemistry and Molecular Biology (BMB)

Courses

BMB 301. Biochemistry. 3 Credits.
Topics including enzymology; bioenergetics; metabolism and its regulation; nucleic acid metabolism; recombinant DNA technology; structure and function of macromolecules. Prerequisite: CHEM 340 or CHEM 342 or an equivalent approved by the department. S.

BMB 401. Biochemistry of Proteins and Information Flow. 3 Credits.
This course will build upon the overview of biochemistry and molecular biology as presented in BMB 301. Topics to be presented include protein structure and function, enzymology, and the expression and transmission of genetic information. Prerequisite: BMB 301. F.

BMB 403. Advanced Biochemistry Laboratory. 2 Credits.
Students will demonstrate competency in understanding and performing physical and molecular techniques commonly used in biomedical research. Prerequisite: Permission of instructor. Prerequisites or Corequisite: BMB 401. F.

Biology (Biol)

B.S. with Major in Biology (p. 53)

B.S. with Major in Biology (Professional Health Sciences Emphasis) (p. 55)

B.S. with Major in Molecular and Integrative Biology (p. 57)

B.S. with Major in Fisheries and Wildlife Biology (p. 57)

Minor in Biology (p. 59)

Courses

BIOL 111. Concepts of Biology. 3 Credits.
Intended for non-science majors seeking general knowledge and cultural appreciation of contemporary biology. F.S.

BIOL 111L. Concepts of Biology Laboratory. 1 Credit.
A basic biology laboratory to complement BIOL 111. Prerequisite or Corequisite: BIOL 111. F.S.

BIOL 120. Orientation to the Biology Major. 1 Credit.
An introduction to careers available to students majoring in Biology and the coursework and other experiences valuable in pursuing those careers. S/U grading. F.

BIOL 121. Introduction to Fisheries and Wildlife Biology. 1 Credit.
This seminar will introduce Fisheries Wildlife Biology Majors to their program curriculum and profession. Topics will include the history and future directions of the Fish Wildlife Profession, specialties within the profession, coursework and training necessary for professional preparation, and potential opportunities for field experience during undergraduate education. Students will also meet fisheries and Wildlife Biologists working for state or federal agencies or nongovernmental organizations to learn what they do and about opportunities for employment. Prerequisite: Permission of the instructor. F.

BIOL 150. General Biology I. 3 Credits.
Basic concepts of biology with emphasis on the process of science, metabolism, cell biology, plant and animal form and function, and physiology. Broadly designed to satisfy the needs of those pursuing biological and preprofessional curricula. F.

BIOL 150L. General Biology I Laboratory. 1 Credit.
A contemporary biology laboratory to complement BIOL 150, 151. Prerequisite or Corequisite: BIOL 150. F.

BIOL 151. General Biology II. 3 Credits.
Basic concepts of biology with emphasis on the process of science, genetics, molecular biology, evolution, biodiversity, and ecology. Broadly designed to satisfy the needs of those pursuing biological and preprofessional curricula. S.

BIOL 151L. General Biology II Laboratory. 1 Credit.
A contemporary biology laboratory to complement BIOL 150, 151. Prerequisite or Corequisite: BIOL 151. S.

BIOL 312. Evolution. 3 Credits.
A study of the processes that have led from the origin of life to the diverse patterns and forms of life observable today. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L or an equivalent approved by the department. S.

BIOL 312L. Evolution Laboratory. 1 Credit.
This course will focus on the application of evolutionary concepts by examining the evolution of organisms and genes. Students will use genetic data and relevant software to construct phylogenies and create tree of life pages. Prerequisites: BIOL 150 and BIOL 151. Corequisite: BIOL 312. S.

BIOL 315. Genetics. 3 Credits.
An introduction to genetics, with emphasis on classical genetic analysis and the biochemistry of gene transmission, expression and regulation. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L or an equivalent approved by the department. F.

BIOL 315R. Genetics Recitation. 1 Credit.
A recitation to aid students enrolled in BIOL 315: Genetics. The class is designed to review both "big idea" concepts from lecture as well as to work through genetics problems. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L Corequisites: BIOL 315. F.

BIOL 320. Forensic Biology. 3 Credits.
Forensic biology is the application of biological sciences to matters of law. This course covers the concept of biological evidence and focuses on human identification using the serological and genetic methods. This is one of the courses that the American Academy of Forensic Sciences recommends for forensic scientists. Prerequisites: BIOL 150 and BIOL 151. S.

BIOL 332. General Ecology. 3 Credits.
An introduction to ecology. Covers the relationship of individuals, populations, communities and ecosystems to their biotic and abiotic environments. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L or an equivalent approved by the department. F.

BIOL 332L. Gen Ecology Lab. 1 Credit.
Field projects and laboratory exercises to complement BIOL 332. Counts as an upper-division laboratory course. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L. Prerequisite or Corequisite: BIOL 332. F.

BIOL 333. Population Biology. 3 Credits.
Principles of population genetics, population ecology, and evolution in plants and animals. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, BIOL 151L, and MATH 93 or higher. S.

BIOL 336. Systematic Botany. 4 Credits.
Morphology, evolution, and classification of vascular plants with emphasis on the flora of the Great Plains. Counts as an upper-division laboratory course. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L or permission of instructor. F, even years.

BIOL 338. Animal Behavior. 2 Credits.
Studies in animal social behavior. The influences of environmental factors on behavior is emphasized. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, BIOL 151L or an equivalent approved by the department. S, even years.

BIOL 341. Cell Biology. 3 Credits.
Description of processes common to life at the cellular level including: biochemical and structural organization, membrane function, motility, signal transduction, growth, division and genetic regulation of the cell. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, BIOL 151L; Prerequisite or Corequisite: CHEM 122. S.

BIOL 341L. Cell Biol Lab. 1 Credit.
Laboratory investigation utilizing techniques to study life at the cellular level including chemical composition and characterization, enzyme kinetics, metabolism and microscopy. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, BIOL 151L. Prerequisites or Corequisites: BIOL 341, CHEM 122. S.

BIOL 350. Plant Ecology. 3 Credits.
Structure and function of plants as they relate to the maintenance of plant populations and communities. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L or permission of instructor. S, even years.

BIOL 360. Soil Ecology. 3 Credits.
This course will survey the abundance, distribution, and identity of biota that are present in soils, their ecological functions, methods of analysis, contemporary theories about soil ecology, and practical methods of promoting soil health in natural and managed systems. Prerequisites: BIOL 150, BIOL 151, and BIOL 332, or consent of Instructor. S, odd years.
BIOL 363. Entomology. 4 Credits.
The course is designed to provide an introduction to the study of insects. It covers the biology, behavior, and ecology of insects, as well as their relationships with other organisms. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L or an equivalent approved by the department. F, even years.

BIOL 364. Parasitology. 2 Credits.
The course covers the biology and ecology of parasitic organisms, including helminths, protozoa, and arthropods. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L. F, even years.

BIOL 364L. Parasitology Laboratory. 2 Credits.
A laboratory course that complements the lecture material. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L or an equivalent approved by the department. S.

BIOL 369. Histology. 2 Credits.
The course covers the microscopic anatomy of vertebrate tissues and organs, with emphasis on the study of tissues and organs. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L or an equivalent approved by the department. S.

BIOL 369L. Histology Lab. 2 Credits.
A laboratory course that complements the lecture material. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L or an equivalent approved by the department. S.

BIOL 370. Animal Physiology. 3 Credits.
The course covers the study of the functions of animals, including the nervous system, endocrine system, and other physiological systems. Prerequisites: BIOL 150 and BIOL 151. S.

BIOL 371. Animal Biology 1. 3 Credits.
The course covers the study of invertebrates, with emphasis on their adaptations to environment and lifestyle. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L or an equivalent approved by the department. F.

BIOL 372. Animal Biology 2. 3 Credits.
The course covers the study of vertebrates, with emphasis on the adaptations of vertebrates to environment and lifestyle. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L or an equivalent approved by the department. S.

BIOL 376. Animal Biology 3. 3 Credits.
The course is an overview of general stages and mechanisms of development, experimental approaches used to study developmental processes, and genetic and environmental influences that govern development. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L or an equivalent approved by the department. S.

BIOL 376L. Animal Biology Laboratory. 1 Credit.
The laboratory course provides practical experience with various developmental concepts. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L or an equivalent approved by the department. S.

BIOL 378. Developmental Biology. 3 Credits.
The course is an introduction to the study of development, emphasizing the mechanisms that govern development. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L or an equivalent approved by the department. F.

BIOL 378L. Developmental Biology Lab. 1 Credit.
The laboratory course provides practical experience with developmental concepts. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L or an equivalent approved by the department. S.

BIOL 380. Disease Biology. 3 Credits.
The course covers the study of infectious and parasitic diseases in animals, including pathogens, transmission, and control. Prerequisites: BIOL 150 and BIOL 151. S, odd years.

BIOL 390. Endocrinology. 3 Credits.
The course focuses on the endocrine system of vertebrates. Students will learn about the hormones and their effects on the body. Prerequisites: BIOL 150, BIOL 151L or an equivalent approved by the department. F, even years.

BIOL 396. Fisheries and Wildlife Biology Pre-Internship Seminar. 1 Credit.
The seminar is designed to prepare students for the internship. It includes career development and knowledge of the field. Prerequisite or Corequisite: BIOL 121. F.

BIOL 397. Cooperative Education. 1-8 Credits.
The course provides practical experience in the field of fisheries and wildlife biology. Students work with employers to gain hands-on experience. Prerequisites: Sophomore standing and approval by the department chair and acceptance by a supervisor. Repeatable to 24 credits. S/U grading. F,S,SS.

BIOL 410. Molecular Biology Techniques. 4 Credits.
The course covers the techniques used in molecular biology, including DNA and RNA analysis, recombinant DNA technology, and high-throughput sequencing. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L. S.

BIOL 415. Genomics. 4 Credits.
The course covers the study of the complete nucleotide sequence of an organism and its implications. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, BIOL 151L, BIOL 315, and BIOL 332. Prerequisite or Corequisite: BIOL 312. S, even years.

BIOL 416. Ecological Genomics. 3 Credits.
The course covers the study of the interactions between organisms and their environment. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, BIOL 151L, BIOL 315, and BIOL 332. Prerequisite or Corequisite: BIOL 312. S, even years.

BIOL 418. Systems Biology. 3 Credits.
The course provides an introduction to the study of complex systems and their interactions. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, BIOL 151L, and BIOL 315. S.

BIOL 420. Neuroscience. 3 Credits.
The course covers the study of the nervous system and its functions. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, BIOL 151L, and BIOL 315. S.

BIOL 425. Ichthyology. 3 Credits.
The course covers the study of fish, including their anatomy, behavior, and classification. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, BIOL 151L, and BIOL 315. S.

BIOL 426. Birds & Mammals. 4 Credits.
The course covers the study of birds and mammals, including their anatomy, behavior, and classification. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, BIOL 151L, and BIOL 315. S.

BIOL 430. Human Dimensions of Wildlife and Fisheries. 3 Credits.
The course covers the study of human dimensions in wildlife and fisheries management. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L. S, odd years.
BIOL 431. Wildlife Management. 4 Credits.
Theory and methods of management of wildlife populations. Counts as an upper-division laboratory course. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L or an equivalent approved by the department. F, odd years.

BIOL 432. Techniques in Wildlife Population Assessment. 4 Credits.
Techniques in Wildlife Population Assessment is a course designed to teach wildlife biology students the techniques used to assess wildlife populations for conservation and management. Students learn the appropriate situations to use the techniques, how to properly conduct the procedures, how to collect data from the use of these techniques, and how to report the findings to a variety of audiences. The structure of the course is designed to teach students proper research methodology so that they not only know how and when to use the techniques, but also how they can apply their findings to make appropriate management recommendations for wildlife conservation and management under a variety of settings or conditions. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L. F, even years.

BIOL 433. Aquatic Ecology. 3 Credits.
Analysis of the relationships between organisms and their physical, chemical and biological environments in freshwater ecosystems. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L or an equivalent approved by the department. S, odd years.

BIOL 435. Large Mammal Ecology and Management. 3 Credits.
A course covering details of the population ecology, specialized management approaches and techniques, and conservation of large-bodied mammals in North America and worldwide. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L. Corequisites: BIOL 332 and BIOL 332L. F, odd years.

BIOL 438. Fisheries Management. 3 Credits.
Concepts and approaches to the management of freshwater fisheries. Course will include discussion of life histories and requirements of important regional sport fishes. Counts as an upper-division laboratory course. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L or instructor permission. S, even years.

BIOL 439. Conservation Biology. 3 Credits.
A course that integrates information from the disciplines of ecology, genetics, biogeography, economics, environmental policy, and ethics towards understanding how to maintain and restore biological diversity. F, odd years.

BIOL 442. Physiology of Organs and Systems. 3 Credits.
Study of the physiology of organs and organ systems in vertebrates. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, BIOL 151L, and Junior or Senior standing or an equivalent approved by the department. F.

BIOL 442L. Physiology of Organs and Systems Laboratory. 1 Credit.
A physiology laboratory to complement BIOL 442. Counts as an upper-division laboratory course. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L or and equivalent approved by the department. Prerequisite or Corequisite: BIOL 442. F.

BIOL 450. Molecular Genetics. 2 Credits.
Topics will include basic molecular genetic mechanisms, recombinant DNA technology, the organization and function of the cell nucleus, and the molecular control of gene expression. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, BIOL 151L, and BIOL 315 or and equivalent approved by the department. On demand.

BIOL 460. Molecular Biology of the Cell. 3 Credits.
A study of the structure and organization of the cell with a special emphasis on genetic regulation of the cell division cycle, the genetic basis of cancer, and the role of genes in the immune system. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, BIOL 151L, and BIOL 315 or and equivalent approved by the department. On demand.

BIOL 470. Biometry. 4 Credits.
Analysis of biological data. Covers descriptive statistics, inferential statistics (e.g., t-tests, goodness-of-fit tests, regression, ANOVA and non-parametric tests), and interpreting and presenting statistical results. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L or and equivalent approved by the department. F.

BIOL 480. Senior Capstone Seminar. 3 Credits.
Key aspects of scientific inquiry and communication are investigated and assessed. Students will participate in discussions of relevant current issues in biology and will develop an independent research project. This course provides an opportunity for students to integrate and apply knowledge and skills obtained in biology. Students must take course within 3 semesters of graduation. Prerequisite: Senior status in biological science or permission of instructor. F.S.

BIOL 481. Fisheries & Wildlife Senior Capstone. 3 Credits.
Key aspects of scientific inquiry and communication are investigated and assessed. Students will participate in discussions of relevant current issues in fisheries and wildlife biology and will complete an independent research project. The course provides an opportunity for students to integrate and apply knowledge and skills acquired in fisheries and wildlife biology. Prerequisites: BIOL 312, BIOL 315, BIOL 332 and senior status in Fisheries and Wildlife Biology or permission of the instructor. S.

BIOL 489. Senior Honors Thesis. 1-15 Credits.
Supervised independent study culminating in a thesis. Prerequisites: Consent of the department and approval of the honors committe. Repeatable to 15 credits. F.S.

BIOL 491. Seminar. 1 Credit.
Discussion of selected topics in advanced biology, a different topic each semester. Prerequisite: Major or minor in biology. Repeatable to 4 credits. On demand.

BIOL 492. Research. 1-4 Credits.
Research conducted under the supervision of a faculty member. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, BIOL 151L, and consent of instructor. Repeatable to 16 credits. F.S.

BIOL 494. Directed Studies. 1-4 Credits.
Designed to meet the needs of individual students in the areas of faculty specialization. Prerequisite: Consent of instructor. Repeatable to 9 credits. F.S.

BIOL 499. Special Topics. 1-4 Credits.
Important and current topics in biology not covered by other courses. Repeatable when topics vary. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L or consent of instructor. Repeatable. On demand.

Bachelor of Science with Major in Biology

This program is designed for students interested in obtaining a broad background in biology, with maximum flexibility in program design. Students should consult with their adviser to develop an appropriate course of study. For example, students anticipating a career in biotechnology or biomedical science research may emphasize coursework in molecular, cellular and developmental biology. Students anticipating careers with ecological and evolutionary applications may emphasize coursework that explores animal behavior, biodiversity, evolutionary history and interactions of organisms and their environments.

Required 120 credits (36 of which must be numbered 300 or above, and 30 of which must be from UND) including:

I. Essential Studies requirements (See University ES listing, minimum 39 total credits.) The following courses must be taken as part of the Essential Studies requirement:

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<td>ENGL 110</td>
<td>College Composition I</td>
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<td>ENGL 130</td>
<td>Composition II: Writing for Public Audiences</td>
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<tr>
<td>COMM 110</td>
<td>Fundamentals of Public Speaking</td>
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II. 44 major hours including:

A. Core requirements (24 hours), all courses below:

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<td>Orientation to the Biology Major</td>
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<td>BIOL 150</td>
<td>General Biology I</td>
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<tr>
<td>&amp; BIOL 151</td>
<td>General Biology II</td>
<td>6</td>
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<tr>
<td>BIOL 150L</td>
<td>General Biology I Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>&amp; BIOL 151</td>
<td>General Biology II Laboratory</td>
<td></td>
</tr>
</tbody>
</table>
**Bachelor of Science with Major in Biology**

### BIOL 312 Evolution 3
- BIOL 315 Genetics 3
- BIOL 332 General Ecology 3
- BIOL 341 Cell Biology 3
- BIOL 480 Senior Capstone Seminar 3

Total Credits 24

* Students who take BIOL 111 Concepts of Biology and BIOL 111L Concepts of Biology Laboratory and earn a grade of "B" or higher in both of those courses prior to becoming a Biology major may complete the General Biology sequence by taking BIOL 150 General Biology I and BIOL 150L General Biology I Laboratory.

** Three credits for an accepted BIOL 489 Senior Honors Thesis can be substituted for the BIOL 480 Senior Capstone Seminar with prior approval of the thesis topic by the Chair of Biology.

We strongly advise mastery of materials in all core courses except BIOL 480 Senior Capstone Seminar prior to enrolling in other 300 or 400 level Biology courses.

At least 15 of the total 44 credits required for the BS degree must be taken in the UND Biology department, exclusive of the credits earned in other departments and institutions.

**B. Advanced requirements (minimum 20 credit hours):**

1. **Electives.** All 300 or 400 level Biology courses will count toward the 20 elective credit hours needed. Certain science courses in other departments may also qualify as electives (see examples below).

   Students may include no more than ten combined credit hours from BIOL 494 Directed Studies; BIOL 492 Research; BIOL 491 Seminar, and BIOL 489 Senior Honors Thesis towards the total 44 credit hours required for this Biology major.

2. **Laboratory Requirement.** At least four upper-division Biology courses with laboratories must be included in the 44 hour major. The following labs or courses satisfy this requirement:

   Courses fulfilling lab requirement *
   - BIOL 312L Evolution Laboratory
   - BIOL 332L Gen Ecology Lab
   - BIOL 336L Systematic Botany
   - BIOL 341L Cell Biol Lab
   - BIOL 363L Entomology
   - BIOL 364L Parasitology Laboratory
   - BIOL 369L Histology Lab
   - BIOL 376L Animal Biology Laboratory
   - BIOL 410 Molecular Biology Techniques
   - BIOL 415 Genomics
   - BIOL 416 Ecological Genomics
   - BIOL 418 Systems Biology
   - BIOL 425 Ichthyology
   - BIOL 426 Birds & Mammals
   - BIOL 431 Wildlife Management
   - BIOL 438 Fisheries Management
   - BIOL 442L Physiology of Organs and Systems Laboratory

   * BIOL 494 Directed Studies or BIOL 492 Research may be counted as one upper-division laboratory requirement with appropriate documentation of the laboratory experience and approval by the supervising faculty member and the Biology Department Chairperson prior to taking the research credits.

   Up to two upper-division, life sciences-related laboratory courses from UND departments outside Biology may be counted toward the four-course, upper-division laboratory requirement. See details about non-Biology courses below.

   Up to three of the following courses from UND departments outside Biology can be applied toward the 20 elective credits required for a BS in Biology degree.

   **| Courses |
   --- | --- |
   ANAT 204 & 204L | Anatomy for Paramedical Personnel and Anatomy for Paramedical Personnel Laboratory |
   ANTH 325 | Human Origins |
   ANTH 335 | Primates |
   BMB 401 | Biochemistry of Proteins and Information Flow |
   BMB 403 | Advanced Biochemistry Laboratory |
   MBIO 302 & 302L | General Microbiology Lecture and General Microbiology Laboratory |
   MBIO 328 | Introduction to Immunology |
   PPT 301 | Human Physiology |

   * BMB 301 Biochemistry will not be allowed to fulfill elective requirements
   * MBIO 202 Introductory Medical Microbiology Lecture/MBIO 202L Introductory Medical Microbiology Laboratory will only be allowed with special permission of the Biology department.
   * Only ANAT 204L Anatomy for Paramedical Personnel Laboratory, BMB 403 Advanced Biochemistry Laboratory, and MBIO 302L General Microbiology Laboratory from the above list can be applied toward the requirement for four advanced labs. PPT 301 Human Physiology will not be allowed for the advanced lab requirement.
   * PPT 301 Human Physiology and BIOL 442 Physiology of Organs and Systems/BIOL 442L Physiology of Organs and Systems Laboratory will not both be counted towards the 44 credit requirement for a UND Biology degree.

   Other courses will be considered on a case by case basis. To have a course considered, the student should provide a syllabus to the Department Chair.

### III. Cognate requirements in other departments (29-32 credit hours):

#### Mathematics

<table>
<thead>
<tr>
<th>Mathematics</th>
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</thead>
<tbody>
<tr>
<td>MATH 146</td>
<td>Applied Calculus I **</td>
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<tr>
<td>or MATH 165</td>
<td>Calculus I</td>
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#### Chemistry

<table>
<thead>
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<th>Chemistry</th>
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</thead>
<tbody>
<tr>
<td>General Chemistry</td>
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</tr>
<tr>
<td>CHEM 121</td>
<td>General Chemistry I</td>
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<tr>
<td>&amp; 121L</td>
<td>and General Chemistry I Laboratory</td>
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<tr>
<td>&amp; CHEM 122</td>
<td>and General Chemistry II</td>
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<tr>
<td>&amp; CHEM 122L</td>
<td>and General Chemistry II Laboratory</td>
</tr>
<tr>
<td>OR</td>
<td></td>
</tr>
<tr>
<td>CHEM 221</td>
<td>Fundamentals of Chemistry - Concepts</td>
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<tr>
<td>&amp; 221L</td>
<td>and Fundamentals of Chemistry Laboratory</td>
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<tr>
<td>&amp; CHEM 254</td>
<td>and Inorganic Chemistry I</td>
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<td>&amp; CHEM 254L</td>
<td>and Inorganic Chemistry I Laboratory</td>
</tr>
<tr>
<td>OR</td>
<td></td>
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<tr>
<td>CHEM 341</td>
<td>Organic Chemistry I</td>
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<tr>
<td>&amp; 341L</td>
<td>and Organic Chemistry I Laboratory</td>
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<tr>
<td>&amp; BMB 301</td>
<td>and Biochemistry</td>
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<td>OR</td>
<td></td>
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<tr>
<td>CHEM 341</td>
<td>Organic Chemistry I</td>
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<tr>
<td>&amp; 341L</td>
<td>and Organic Chemistry I Laboratory</td>
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<td>&amp; CHEM 342</td>
<td>and Organic Chemistry II</td>
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<td>&amp; CHEM 342L</td>
<td>and Organic Chemistry II Laboratory</td>
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<tr>
<td>OR</td>
<td></td>
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<tr>
<td>CHEM 341</td>
<td>Organic Chemistry I</td>
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<tr>
<td>&amp; 341L</td>
<td>and Organic Chemistry I Laboratory</td>
</tr>
<tr>
<td>&amp; BMB 301</td>
<td>and Biochemistry</td>
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</table>

#### Physical Sciences

<table>
<thead>
<tr>
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<tr>
<td>PHYS 161</td>
<td>Introductory College Physics I</td>
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<td>&amp; PHYS 162</td>
<td>and Introductory College Physics II</td>
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<tr>
<td>OR</td>
<td></td>
</tr>
<tr>
<td>PHYS 211</td>
<td>College Physics I</td>
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<td>&amp; PHYS 212</td>
<td>and College Physics II</td>
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<td>OR</td>
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<tr>
<td>PHYS 251</td>
<td>University Physics I</td>
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<tr>
<td>&amp; PHYS 252</td>
<td>and University Physics II</td>
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</table>

#### Statistical Methods and Data Interpretation

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>ANAT 204</td>
<td>Anatomy for Paramedical Personnel</td>
</tr>
<tr>
<td>ANTH 325</td>
<td>Human Origins</td>
</tr>
<tr>
<td>ANTH 335</td>
<td>Primates</td>
</tr>
<tr>
<td>BMB 401</td>
<td>Biochemistry of Proteins and Information Flow</td>
</tr>
<tr>
<td>BMB 403</td>
<td>Advanced Biochemistry Laboratory</td>
</tr>
<tr>
<td>MBIO 302</td>
<td>General Microbiology Lecture</td>
</tr>
<tr>
<td>&amp; 302L</td>
<td>and General Microbiology Laboratory</td>
</tr>
<tr>
<td>MBIO 328</td>
<td>Introduction to Immunology</td>
</tr>
<tr>
<td>PPT 301</td>
<td>Human Physiology</td>
</tr>
<tr>
<td>OR</td>
<td></td>
</tr>
<tr>
<td>BMB 401</td>
<td>Biochemistry of Proteins and Information Flow</td>
</tr>
<tr>
<td>BMB 403</td>
<td>Advanced Biochemistry Laboratory</td>
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<tr>
<td>MBIO 302</td>
<td>General Microbiology Lecture</td>
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<tr>
<td>&amp; 302L</td>
<td>and General Microbiology Laboratory</td>
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<tr>
<td>MBIO 328</td>
<td>Introduction to Immunology</td>
</tr>
<tr>
<td>PPT 301</td>
<td>Human Physiology</td>
</tr>
<tr>
<td>OR</td>
<td></td>
</tr>
<tr>
<td>CHEM 221</td>
<td>Fundamentals of Chemistry - Concepts</td>
</tr>
<tr>
<td>&amp; 221L</td>
<td>and Fundamentals of Chemistry Laboratory</td>
</tr>
<tr>
<td>&amp; CHEM 254</td>
<td>and Inorganic Chemistry I</td>
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<tr>
<td>&amp; CHEM 254L</td>
<td>and Inorganic Chemistry I Laboratory</td>
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<td></td>
</tr>
<tr>
<td>CHEM 341</td>
<td>Organic Chemistry I</td>
</tr>
<tr>
<td>&amp; 341L</td>
<td>and Organic Chemistry I Laboratory</td>
</tr>
<tr>
<td>&amp; BMB 301</td>
<td>and Biochemistry</td>
</tr>
</tbody>
</table>

Select one of the following:
Bachelor of Science with Major in Biology (Professional Health Sciences Emphasis)

This major is designed for students interested in medical professions (medicine, osteopathic medicine, dentistry, optometry, pharmacy, podiatry and veterinary), or allied medical professions (physician assistant, occupational therapy, physical therapy, or medical research). Health sciences students should consult with their Biology advisor and the Health Sciences advisor in the College of Arts and Sciences to develop an appropriate course of study.

Required 120 credits (36 of which must be numbered 300 or above, and 30 of which must be from UND), including:

I. Essential Studies requirements (see University ES listing, minimum 39 total credits). The following courses must be taken as part of the Essential Studies requirement:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 110</td>
<td>College Composition I</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 130</td>
<td>Composition II: Writing for Public Audiences</td>
<td>3</td>
</tr>
<tr>
<td>COMM 110</td>
<td>Fundamentals of Public Speaking</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Total Credits</td>
<td>9</td>
</tr>
</tbody>
</table>

II. 39 major hours including:

A. Core requirements (18 credit hours), all courses below:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 120</td>
<td>Orientation to the Biology Major</td>
<td>1</td>
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<tr>
<td>BIOL 150</td>
<td>General Biology I</td>
<td>6</td>
</tr>
<tr>
<td>&amp; BIOL 151</td>
<td>General Biology II</td>
<td></td>
</tr>
<tr>
<td>BIOL 150L</td>
<td>General Biology I Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>&amp; BIOL 151L</td>
<td>General Biology II Laboratory</td>
<td></td>
</tr>
<tr>
<td>BIOL 315</td>
<td>Genetics</td>
<td>3</td>
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<tr>
<td>BIOL 341</td>
<td>Cell Biology</td>
<td>3</td>
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<td>BIOL 480</td>
<td>Senior Capstone Seminar</td>
<td>3</td>
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<tr>
<td></td>
<td>Total Credits</td>
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</table>

* Students who take BIOL 111 Concepts of Biology and BIOL 111L Concepts of Biology Laboratory and earn a grade of "B" or higher in both of those courses prior to becoming a Biology major may complete the General Biology sequence by taking BIOL 150 General Biology I and BIOL 150L General Biology I Laboratory.

** Three credits for an accepted BIOL 489 Senior Honors Thesis can be substituted for the BIOL 480 Senior Capstone Seminar with prior approval of the thesis topic by the Chair of Biology.

We strongly advise mastery of materials in all core courses except BIOL 480 Senior Capstone Seminar prior to enrolling in other 300 or 400 level Biology courses.

At least 15 of the total 39 credits required for the BS degree must be taken in the UND Biology department, exclusive of the credits earned in other departments and institutions.

B. Advanced requirements (minimum 21 credit hours):

1. Select at least 3 (or more) of the following courses (minimum 9 credits):

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANAT 204</td>
<td>Anatomy for Paramedical Personnel</td>
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<tr>
<td>ANAT 204L</td>
<td>Anatomy for Paramedical Personnel Laboratory</td>
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</tr>
<tr>
<td>BIOL 364</td>
<td>Parasitology</td>
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<tr>
<td>BIOL 364L</td>
<td>Parasitology Laboratory</td>
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<tr>
<td>BIOL 369</td>
<td>Histology</td>
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<td>BIOL 369L</td>
<td>Histology Lab</td>
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<td>BIOL 378</td>
<td>Developmental Biology</td>
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<tr>
<td>BIOL 380</td>
<td>Disease Biology</td>
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<tr>
<td>BIOL 390</td>
<td>Endocrinology</td>
<td></td>
</tr>
<tr>
<td>BIOL 415</td>
<td>Genomics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total Credits</td>
<td>9</td>
</tr>
</tbody>
</table>
BIOL 418  Systems Biology
BIOL 420  Neuroscience
BIOL 442  Physiology of Organs and Systems
BIOL 442L Physiology of Organs and Systems Laboratory
MBIO 302  General Microbiology Lecture
MBIO 302L  General Microbiology Laboratory
MBIO 328  Introduction to Immunology

2. Other Electives:

BIOL 312  Evolution
BIOL 320  Forensic Biology
BIOL 332  General Ecology
BIOL 333  Population Biology
BIOL 341L  Cell Biol Lab
BIOL 376  Animal Biology
BIOL 376L  Animal Biology Laboratory
BIOL 410  Molecular Biology Techniques

3. Laboratory Requirement. At least four upper-division Biology courses with laboratories must be included. The following labs or courses satisfy this requirement:

BIOL 312L  Evolution Laboratory
BIOL 332L  Gen Ecology Lab
BIOL 336  Systematic Botany
BIOL 341L  Cell Biol Lab
BIOL 363  Entomology
BIOL 364L  Parasitology Laboratory
BIOL 369L  Histology Lab
BIOL 376L  Animal Biology Laboratory
BIOL 410  Molecular Biology Techniques
BIOL 415  Genomics
BIOL 416  Ecological Genomics
BIOL 418  Systems Biology
BIOL 425  Ichthyology
BIOL 426  Birds & Mammals
BIOL 431  Wildlife Management
BIOL 438  Fisheries Management
BIOL 442L Physiology of Organs and Systems Laboratory

* All 300 or 400 level Biology courses, including any of those listed above, will count toward the elective credit hours needed. Certain sciences courses in other departments may also qualify as electives (see examples below).

** BIOL 494 Directed Studies, or BIOL 492 Research may be counted as one upper-division laboratory requirement with appropriate documentation of the laboratory experience and approval by the supervising faculty member or the Biology Department Chairperson prior to taking the research credits.

Up to two upper-division, life sciences-related laboratory courses from UND departments outside Biology may be counted toward the four-course, upper-division laboratory requirement. See details about non-Biology courses below.

* Up to three of the following courses from UND departments outside Biology can be applied toward the 39 credits required for a BS in Biology degree.

** Prerequisites for either course are the responsibility of the student.

* BIOL 202 Introductory Medical Microbiology Lecture/MBIO 202L
  Introductory Medical Microbiology Laboratory will only be allowed with special permission of the Biology department.

* PPT 301 Human Physiology will not be allowed for the advanced lab requirement.

* ANAT 204 Anatomy for Paramedical Personnel Laboratory, MBIO 403 Advanced Biochemistry Laboratory, and MBIO 302L General Microbiology Laboratory can be applied toward the requirement for four advanced labs. PPT 301 Human Physiology will not be allowed for the advanced lab requirement.

* PPT 301 Human Physiology and BIOL 442 Physiology of Organs and Systems/BIO 442L Physiology of Organs and Systems Laboratory will not both be counted towards the 39 credit requirement for this UND Biology degree.

* Other courses will be considered on a case by case basis. To have a course considered, the student should provide a syllabus to the Department Chair.

III. Cognate requirements in other departments (29-32 credit hours):

Mathematics
MATH 146  Applied Calculus I *** 3-4
* or MATH 165  Calculus I

Chemistry
General chemistry
CHEM 121  General Chemistry I
& 121L  and General Chemistry I Laboratory
& CHEM 122  and General Chemistry II
& CHEM 122L  and General Chemistry II Laboratory

Organic Chemistry
CHEM 340L  Survey of Organic Chemistry
& 340L  and Survey of Organic Chemistry Laboratory
& BMB 301  and Biochemistry

Physical Sciences
PHYS 161  Introductory College Physics I
& PHYS 162  and Introductory College Physics II (OR)

Statistical Methods and Data Interpretation
Select one of the following: 3

BIOI 470  Biometry *
PSYC 241  Introduction to Statistics
SOC 326  Sociological Statistics
MATH 321  Applied Statistical Methods

* Students with a particular aptitude for mathematics should consider taking both MATH 165 Calculus I and MATH 166 Calculus II and should consult with their adviser regarding this potential option.

** Prerequisites for either course are the responsibility of the student.
### Bachelor of Science with Major in Fisheries and Wildlife Biology

The Department offers a four-year program leading to the degree of Bachelor of Science in Fisheries and Wildlife Biology. Students completing this program are qualified to obtain positions with state, federal and private fisheries and wildlife organizations.

Required 120 credits (36 of which must be numbered 300 or above, and 30 of which must be from UND) including:

I. Essential Studies requirements (see University ES listing, minimum 39 total credits). The following courses must be taken as part of the Essential Studies requirement:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ENGL 110</td>
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<tr>
<td>ENGL 130</td>
<td>3</td>
</tr>
<tr>
<td>COMM 110</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits: 9

II. The following curriculum:

55-58 major hours, including:

#### Basic Courses

<table>
<thead>
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<th>Course</th>
<th>Credits</th>
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<tr>
<td>BIOL 121</td>
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<td>&amp; BIOL 151L</td>
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<td>BIOL 312</td>
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<td>BIOL 315</td>
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<tr>
<td>BIOL 332</td>
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<td>&amp; 332L</td>
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#### Advanced Courses

<table>
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<th>Course</th>
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<tr>
<td>BIOL 333</td>
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<td>BIOL 396</td>
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<td>BIOL 397</td>
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<td>BIOL 470</td>
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<td>BIOL 481</td>
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Select one of the following plant courses: 3-4

<table>
<thead>
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<th>Credits</th>
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<tbody>
<tr>
<td>BIOL 336</td>
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<td>BIOL 350</td>
<td>1</td>
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Select at least three of the following management courses: 9-11

<table>
<thead>
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<th>Course</th>
<th>Credits</th>
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<td>BIOL 431</td>
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<tr>
<td>BIOL 432</td>
<td>1</td>
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<td>BIOL 438</td>
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<tr>
<td>BIOL 439</td>
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### Electives

Select minimum of 12 hours of the following: 12

<table>
<thead>
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<th>Course</th>
<th>Credits</th>
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<tbody>
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<tr>
<td>BIOL 360</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 363</td>
<td>3</td>
</tr>
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</table>

**Total Credits: 18-19**

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### Bachelor of Science with Major in Molecular and Integrative Biology

Study of life science in the past has been largely confined to the intellectual platforms associated with individual levels of biological organization, e.g., molecular biology, cellular biology, physiology of organisms, and ecology. This degree program emphasizes integration of knowledge across levels of biological organization from the gene/molecular/cellular to the development and physiology of individual organisms, along with their adaptation to local environments. The new training model has greater potential to contribute to educational success, medical advances, technological innovation, and commercialization of knowledge. Coursework in the degree provides a strong foundation for students planning to either continue their studies in medical science, graduate, and professional programs or pursue technical positions/further training or professional positions in applied health science and biotechnology. Students in the degree program will be encouraged, depending on their interests, to pursue research experiences with faculty in the medical or life sciences, and internships with regional biotechnology corporations.
Required 120 credits, 36 of which must be numbered 300 or above, and 60 of which must be from a 4-year institution, including:

I. Essential Studies (ES) requirements (See University ES listing), minimum 39 total credits. The following course must be taken as part of the Essential Studies requirement:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>COMM 110  Fundamentals of Public Speaking</td>
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<tr>
<td>Total Credits</td>
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</tr>
</tbody>
</table>

II. Core and Advanced Requirements (48 credit hours):

A. Core requirements (24 hours), all courses below:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 120 Orientation to the Biology Major</td>
<td>1</td>
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<tr>
<td>BIOL 150 General Biology I</td>
<td>6</td>
</tr>
<tr>
<td>&amp; BIOL 151 General Biology II</td>
<td>1</td>
</tr>
<tr>
<td>BIOL 150L General Biology I Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>&amp; BIOL 151L and General Biology II Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>BIOL 312 Evolution</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 315 Genetics</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 332 General Ecology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 341 Cell Biology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 480 Senior Capstone Seminar</td>
<td>3</td>
</tr>
<tr>
<td>Total Credits</td>
<td>24</td>
</tr>
</tbody>
</table>

* Students who take BIOL 111 Concepts of Biology and BIOL 111L Concepts of Biology Laboratory and earn a grade of "B" or higher in both of those courses prior to becoming a Molecular & Integrative Biology major may complete the General Biology sequence by taking BIOL 150 General Biology I and BIOL 150L General Biology I Laboratory.

** Three credits for an accepted BIOL 489 Senior Honors Thesis can be substituted for the BIOL 480 Senior Capstone Seminar with prior approval of the thesis topic by the Chair of Biology.

We strongly advise mastery of materials in all core courses except BIOL 480 Senior Capstone Seminar prior to enrolling in other 300 or 400 level Biology courses.

No more than one Biology course at the 200 level will count toward the 48 hour major.

At least four upper-division Biology courses with laboratories must be included in the 48 hour major. Specifically:

- BIOL 494 Directed Studies, or BIOL 492 Research, may be counted as one upper-division laboratory requirement with appropriate documentation of the laboratory experience and approval by the supervising faculty member and the Biology Department Chairperson prior to taking the research credits.
- Up to two upper-division, life sciences-related laboratory courses from the UND departments outside Biology may be counted toward the four-course, upper-division laboratory requirement, provided they do not overlap extensively with subject matter in Biology Department courses also being used for credit. Only ANAT 204L Anatomy for Paramedical Personnel Laboratory, BMB 403 Advanced Biochemistry Laboratory and MBIO 302L General Microbiology Laboratory can be applied toward the requirement for four advanced labs. PPT 301 Human Physiology will not be allowed for the advanced lab requirement.

No more than two upper-division, life sciences-related courses (lecture + lab = 1 course) from UND departments outside Biology will count toward the 48 hour major. Specifically:

- PPT 301 Human Physiology and BIOL 442 Physiology of Organs and Systems/BIOL 442L Physiology of Organs and Systems Laboratory will not both be counted towards the 48 credit requirement for the degree.
- Other courses will be considered on a case by case basis. To have a course considered provide a syllabus to the Department Chair.
- At least 15 of the total 48 credits required for the BS degree must be taken in the UND Biology department, exclusive of the credits earned in other departments.

B. Advanced requirements (minimum 24 credit hours):

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>at least 2 of the following</td>
<td>6-8</td>
</tr>
<tr>
<td>BIOL 415 Genomics</td>
<td></td>
</tr>
<tr>
<td>BIOL 418 Systems Biology</td>
<td></td>
</tr>
<tr>
<td>BIOL 416 Ecological Genomics</td>
<td></td>
</tr>
<tr>
<td>at least 1 of the following</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 378 Developmental Biology</td>
<td></td>
</tr>
<tr>
<td>BIOL 442 Physiology of Organs and Systems</td>
<td></td>
</tr>
<tr>
<td>BIOL 390 Endocrinology</td>
<td></td>
</tr>
<tr>
<td>BIOL 410 Molecular Biology Techniques</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 470 Biometry</td>
<td>4</td>
</tr>
<tr>
<td>at least 1 of the following</td>
<td>2-3</td>
</tr>
<tr>
<td>BIOL 397 Cooperative Education (2 cr.)</td>
<td></td>
</tr>
<tr>
<td>BIOL 492 Research (3 cr.)</td>
<td></td>
</tr>
</tbody>
</table>

Additional Electives

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>up to least 24</td>
<td></td>
</tr>
</tbody>
</table>

* To identify potential research opportunities in faculty labs, government agencies, or the biotechnology industry, students are encouraged to consult with their advisor and engage with faculty and/or regional biotech corporations early in their program of study regarding availability of research and internship opportunities. Research in other departments or colleges may also satisfy this requirement, with prior approval from the Department Chair.

III. Cognate requirements in other departments (27-31 credit hours):

**Mathematics**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 146 Applied Calculus I</td>
<td>3-4</td>
</tr>
<tr>
<td>or MATH 165 Calculus I</td>
<td></td>
</tr>
</tbody>
</table>

**Chemistry and Biochemistry**

**General Chemistry**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 121 General Chemistry I</td>
<td></td>
</tr>
<tr>
<td>&amp; 121L and General Chemistry I Laboratory</td>
<td></td>
</tr>
<tr>
<td>&amp; CHEM 122 and General Chemistry II</td>
<td></td>
</tr>
<tr>
<td>&amp; CHEM 122L and General Chemistry II Laboratory</td>
<td></td>
</tr>
<tr>
<td>OR</td>
<td></td>
</tr>
<tr>
<td>CHEM 221 Fundamentals of Chemistry - Concepts</td>
<td></td>
</tr>
<tr>
<td>&amp; 221L and Fundamentals of Chemistry Laboratory</td>
<td></td>
</tr>
<tr>
<td>&amp; CHEM 254 and Inorganic Chemistry I</td>
<td></td>
</tr>
<tr>
<td>&amp; CHEM 254L and Inorganic Chemistry I Laboratory</td>
<td>#</td>
</tr>
</tbody>
</table>

**Organic Chemistry**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 340 Survey of Organic Chemistry</td>
<td></td>
</tr>
<tr>
<td>&amp; 340L and Survey of Organic Chemistry Laboratory</td>
<td></td>
</tr>
<tr>
<td>OR</td>
<td></td>
</tr>
<tr>
<td>CHEM 341 Organic Chemistry I</td>
<td></td>
</tr>
<tr>
<td>&amp; 341L and Organic Chemistry I Laboratory</td>
<td></td>
</tr>
<tr>
<td>&amp; CHEM 342 and Organic Chemistry II</td>
<td></td>
</tr>
<tr>
<td>&amp; CHEM 342L and Organic Chemistry II Laboratory</td>
<td>**</td>
</tr>
</tbody>
</table>

**Biochemistry**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMB 301 Biochemistry</td>
<td></td>
</tr>
</tbody>
</table>

**Physical Sciences**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 211 College Physics I</td>
<td></td>
</tr>
<tr>
<td>&amp; PHYS 212 College Physics II</td>
<td></td>
</tr>
<tr>
<td>OR</td>
<td></td>
</tr>
</tbody>
</table>
Students with a particular aptitude for mathematics should consider taking both MATH 165 Calculus I and MATH 166 Calculus II and should consult with their advisor regarding this potential option.

** Pre-requisites for either course are the responsibility of the student.

*** The sequence of CHEM 341 Organic Chemistry I and CHEM 342 Organic Chemistry II is highly recommended for pre-med students because some medical schools require or prefer this combination.

# The chemistry sequence CHEM 221, CHEM 221L, CHEM 254, and CHEM 254L is intended for students with a strong background and interest in chemistry and presumes some exposure to calculus.

## Minor in Biology

Required 20 hours, including:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 150</td>
<td>General Biology I</td>
<td>6</td>
</tr>
<tr>
<td>&amp; BIOL 151</td>
<td>and General Biology II</td>
<td></td>
</tr>
<tr>
<td>BIOL 150L</td>
<td>General Biology I Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>&amp; BIOL 151L</td>
<td>and General Biology II Laboratory</td>
<td></td>
</tr>
<tr>
<td>BIOL 315</td>
<td>Genetics</td>
<td>3</td>
</tr>
<tr>
<td>or BIOL 341</td>
<td>Cell Biology</td>
<td></td>
</tr>
<tr>
<td>BIOL 312</td>
<td>Evolution</td>
<td>3</td>
</tr>
<tr>
<td>or BIOL 332</td>
<td>General Ecology</td>
<td></td>
</tr>
<tr>
<td>Electives</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Credits</td>
<td></td>
<td>20</td>
</tr>
</tbody>
</table>

All other 300 or 400 level biology courses, including those listed above that have not already been taken to meet the minor requirements, will count toward the 20 hour minor.

No more than one UND life science course from outside the Biology Department may be counted toward completion of the minor.

## Biomedical Science (BIMD)

### Courses

**BIMD 492. Peer Teaching and Tutoring in Biomedical Sciences. 1-4 Credits.**
A course designed to provide individual students with the opportunity to peer teach and/or tutor for classes in the department of Biomedical Sciences. This experience will occur under the direction of a departmental faculty member. Experiences will have variation dependent on the class the student is assisting with. Open to all students with consent of the faculty member. Repeatable to 12 credits. S/U grading. F,S,SS.

**BIMD 494. Directed Studies. 1-4 Credits.**
A course designed to provide individual students with the opportunity for creative, scholarly and research activities in Biomedical Sciences under the direction of a departmental faculty member. Repeatable to 12 credits.

## Business Administration (BAdm)

**Minor in International Business** (p. 60)

**Minor in Chinese Studies: Culture and Business** (p. 60)

**Minor in Sport Business** (p. 60)

The College of Business and Public Administration offers two courses under the BAdm prefix that are available to any student on campus. Our Introduction to Business course fulfills essential studies requirements and provides students with an overview of all business topics. BAdm 395 courses are generally restricted to business majors. The purpose of these courses is to provide special interest courses for particular groups of students. The course title and number may also be used for experimental courses which may later be established as regular offerings within departments or programs.

### BADM Courses

**BADM 101. Introduction to Business. 3 Credits.**
An essential studies business course and the first step in a well-planned learning agenda that prepares students to become contributing citizens capable of making astute personal economic decisions. Topics covered include economic environment, global competition, entrepreneurship, general and human resources management, marketing, accounting, finance, information systems, and challenges of business careers. In order to foster students' ability to think critically, the course emphasizes an integrated approach that provides opportunities for synergy among various business functions. F,S,SS.

**BADM 105. Career Development I. 1 Credit.**
This course is the first in a series of four courses designed to address career exploration processes. Through this series of courses, important topics such as exploring career interests, developing a resume, improving interview skills, learning effective networking skills, and working with a mentor are covered. Prerequisite: CoBPA pre-majors and majors only. F,S.

**BADM 106. Career Development II. 1 Credit.**
This course is the second in a series of four courses designed to address career exploration processes. Through this series of courses, important topics such as exploring career interests, developing a resume, improving interview skills, learning effective networking skills, and working with a mentor are covered. Prerequisites: BADM 105 and CoBPA pre-majors and majors only with sophomore or above standing. F.

**BADM 205. Career Development III. 1 Credit.**
This course is the third in a series of four courses designed to address career exploration processes. Through this series of courses, important topics such as exploring career interests, developing a resume, improving interview skills, learning effective networking skills, and working with a mentor are covered. Prerequisites: BADM 105, BADM 106, and CoBPA pre-majors and majors only with Junior or above standing. S.

**BADM 206. Career Development IV. 1 Credit.**
This course is the fourth in a series of four courses designed to address career exploration processes. Through this series of courses, important topics such as exploring career interests, developing a resume, improving interview skills, learning effective networking skills, and working with a mentor are covered. Prerequisites: BADM 105, BADM 106, BADM 206 and CoBPA majors only with Senior standing. F,S.

**BADM 225. Professional Communication for Business. 3 Credits.**
An overview of the communication process, including composition of business letters and reports, use of computer technologies, strategies for oral communication and listening, as well as a brief review of writing mechanics. Clear, concise, effective presentation and logical organization of business messages are emphasized. F,S.

**BADM 316. Introduction to Business in China. 3 Credits.**
An overview of China’s past, present and future with particular emphasis on cross-cultural business skills and doing business in China today. S.

**BADM 318. China Then and Now. 3 Credits.**
Offered only in China, this course examines China’s culture, customs, politics, and artistic heritage through existing monuments, temples, historic residences, city structures and artifacts. SS.

**BADM 319. Business Fieldwork in Shanghai. 3 Credits.**
Offered only in China, this course exposes students to the practical problems associated with conducting business in China through lectures and fieldwork. SS.

**BADM 325. Business Research Writing and Culture. 3 Credits.**
An exposure to research writing, including what research is and its importance in the business world. Students will be shown how to gather data, analyze data, and manage the writing process. Students will learn how to develop and structure an academic research paper that demonstrates cultural agility. Prerequisites: ENGL 110 or ENGL 130. S.

**BADM 395A. Special Topics. 1-4 Credits.**
Specially arranged seminars, courses, or independent study on a variety of subjects not covered by regular departmental offerings. May be initiated by students with approval of dean and departments involved. BADM 395A-B repeatable to 9 credits. Repeatable to 9 credits. F,S,SS.
BADM 395B. Special Topics. 1-4 Credits.
Specially arranged seminars, courses, or independent study on a variety of subjects not covered by regular departmental offerings. May be initiated by students with approval of dean and departments involved. BADM 395A-B repeatable to 9 credits. Repeatable to 9 credits. S/U grading. F,S,SS.

BADM 497. Internship in China. 1-6 Credits.
Approval of Director of International Business Programs Required. On the job work experience (may be compensated or not) in various areas of business in China. Prerequisite: Approval of the Director of International Business Programs. S/U grading.

SPRT Courses

SPRT 205. Introduction to Sport Business. 3 Credits.
An overview of the business of sport, including career opportunities. A study of the value of professional business practices to sport organizations. F,S.

SPRT 310. Economics of Sport. 3 Credits.
Application of macro and micro economic theory to the analysis of sports markets. Prerequisite: SPRT 205. On demand.

SPRT 320. Sport Financial Management. 3 Credits.
Application of financial theories to the sport industry. Addresses how sport entities such as professional sport franchises, professional sport leagues, university athletic departments and government-funded programs operate from a financial standpoint. Prerequisite: SPRT 205. F.

SPRT 330. Sport Law. 3 Credits.
Identification and analysis of legal issues, and the ramifications of these issues as they relate to the sports industry. Includes coverage of contracts, antitrust law, labor relations, collective bargaining, agent-athlete relations, intellectual property, governing bodies, and presentation of the athlete. Prerequisite: SPRT 205. F.

SPRT 395. Special Topics in Sport Business. 1-3 Credits.
Specific topics will vary. Provides opportunities for in-depth study beyond that of regularly scheduled courses. May be seminars, workshops, or lectures. Repeatable to a maximum of 6 credits. Prerequisite: SPRT 205. Repeatable to 6 credits. On demand.

SPRT 397. Cooperative Education in Sport Business. 1-2 Credits.
Substantive, compensated on-the-job experiential learning with a participating organization in a segment of the sport industry. Three credits of SPRT 397 or SPRT 497 are required in the Sport Business minor. Credits beyond the first three are elective credits. Prerequisite: Approval of Sport Business Internship Coordinator. Repeatable to 3 credits. S/U grading. F,S,SS.

SPRT 440. Sport Branding and Sponsorship. 3 Credits.
Examining the influence of sport participants and spectators on the development of branding strategies and sponsorship relationships in the multi-faceted sports industry. Prerequisite: SPRT 205. S.

SPRT 450. Facility and Event Planning. 3 Credits.
Programs, functions, and procedures necessary to organize and develop sport facilities and events. Planning, design, and operation of sport facilities are investigated. Additionally, the multi-faceted nature of event development is examined in a variety of sport settings. Prerequisite: SPRT 205. S.

SPRT 497. Internship in Sport Business. 1-6 Credits.
Substantive on-the-job experiential learning with a participating organization in a segment of the sport industry. May or may not be compensated. Three credits of SPRT 397 or SPRT 497 are required in the Sport Business minor. Credits beyond the first three are elective credits. Repeatable to a maximum of 6 credits. Prerequisite: Approval of Sport Business Internship Coordinator. Repeatable to 6 credits. S/U grading. F,S,SS.

Minor in Chinese Studies: Culture and Business

The minor in Chinese Studies: Culture and Business is offered through the College of Business and Public Administration and is open to all students across campus. The Chinese Studies minor provides a formal, structured, multidisciplinary approach to the study of modern China, its history, language, customs, culture and economy. The program targets students from all majors for in-depth examination of a region of growing global importance with special emphasis on the practical development of cross-cultural business skills. The minor requires a minimum or 23 credits in three different categories: Chinese language, area studies and business. It also requires fieldwork or an internship experience in China.

Program Requirements: a minimum of 23 credits distributed between Parts A, B and C as follows:

Language (Part A)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHIN 101</td>
<td>First Year Chinese I</td>
<td>4</td>
</tr>
<tr>
<td>CHIN 102</td>
<td>First Year Chinese II</td>
<td>4</td>
</tr>
</tbody>
</table>

Area Studies (Part B)

Select two of the following: 6

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHIN 305</td>
<td>Chinese Culture Through Films</td>
<td></td>
</tr>
<tr>
<td>CHIN 306</td>
<td>Introduction to Chinese Calligraphy</td>
<td></td>
</tr>
<tr>
<td>HIST 362</td>
<td>Modern China</td>
<td></td>
</tr>
<tr>
<td>PHIL 316</td>
<td>Daoism and Confucianism</td>
<td></td>
</tr>
<tr>
<td>GEOG 463</td>
<td>Regional Geography</td>
<td></td>
</tr>
<tr>
<td>ENGL 299</td>
<td>Special Topics</td>
<td></td>
</tr>
</tbody>
</table>

Business Studies (Part C)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BADM 316</td>
<td>Introduction to Business in China</td>
<td>3</td>
</tr>
<tr>
<td>BADM 318</td>
<td>China Then and Now</td>
<td>6</td>
</tr>
<tr>
<td>&amp; BADM 319 &amp; BADM 497</td>
<td>Internship in China</td>
<td>3</td>
</tr>
<tr>
<td>or BADM 497</td>
<td>Internship in China</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 23

Minor in International Business
(for Business majors only)

The College of Business and Public Administration provides undergraduate business students with the opportunity to earn a minor in international business. The minor requires a minimum of 24 semester hours: nine hours from various international business courses, nine hours from various arts and sciences courses focused on global issues, and achievement of a Level II proficiency in a language (8 hours) or approved study abroad (6 hours).

Required 24-26 hours, including:

Select three of the following: 9  

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 380</td>
<td>International Accounting</td>
<td></td>
</tr>
<tr>
<td>ECON 338</td>
<td>International Economics</td>
<td>*</td>
</tr>
<tr>
<td>ECON 380</td>
<td>Global Economic Development</td>
<td>*</td>
</tr>
<tr>
<td>ECON 438</td>
<td>International Money and Finance</td>
<td>*</td>
</tr>
<tr>
<td>FIN 430</td>
<td>International Financial Management</td>
<td></td>
</tr>
<tr>
<td>MGMT 420</td>
<td>Multinational Management</td>
<td></td>
</tr>
<tr>
<td>MKIT 325</td>
<td>International Marketing</td>
<td></td>
</tr>
</tbody>
</table>

Select three of the following: 9

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANTH 171</td>
<td>Introduction to Cultural Anthropology</td>
<td></td>
</tr>
<tr>
<td>GEG 161</td>
<td>World Regional Geography</td>
<td></td>
</tr>
<tr>
<td>HIST 102</td>
<td>Western Civilization II</td>
<td></td>
</tr>
<tr>
<td>POLS 220</td>
<td>International Politics</td>
<td></td>
</tr>
<tr>
<td>POLS 225</td>
<td>Comparative Politics</td>
<td></td>
</tr>
</tbody>
</table>

Completion of Level II Proficiency in a language (8 hours) or approved university study abroad (6 hours).

Completion of B.B.A. or B.Acc. degree

Total Credits 24-26

* Only one of the above economic courses may be used.

Minor in Sport Business

The College of Business and Public Administration provides undergraduate students with the opportunity to earn a minor in sport business. Students receive a conceptual grounding in sport-specific business thought through coursework as well as experience in the sports field through internship opportunities. Students are encouraged to select a major which corresponds to a sport career choice of interest. Options are covered in the Introduction
CHE 305. Separations, 3 Credits.
Theory and application of rate-based and equilibrium-staged separations.
Prerequisites: CHE 303 and CHE 201 with a grade of C or better; Chemical Engineering majors only or permission of instructor. Prerequisite or Corequisite: CHE 206. S.

CHE 315. Engineering Statistics and Design of Experiments, 3 Credits.
Statistical background needed to plan, conduct, and analyze engineering experiments. Topics include propagation of error, confidence intervals, hypothesis testing, linear regression, analysis of variance, and an introduction to statistical design of experiments. Prerequisite: CEM majors only or permission of instructor. Prerequisite or Corequisite: MATH 265. S.

CHE 321. Chemical Engineering Reactor Design, 3 Credits.
Theory of chemical reaction rates. Design of batch, tubular, CSTR and catalytic chemical reactors. Prerequisites: CHE 206, MATH 266 and C or better in CHE 201; Chemical Engineering majors only or permission of instructor. S.

CHE 331. Chemical Engineering Laboratory II, 2 Credits.
Experiments illustrating physico-chemical principles and the application of fluid flow and heat transfer theory. Prerequisites: CHE 315, CHE 206, and C or better in CHE 201; Chemical Engineering majors only or permission of instructor. F.

CHE 332. Chemical Engineering Laboratory III, 2 Credits.
Experiments reinforcing physico-chemical principles, unit operations, and separations. Pre-design labs are also introduced. Prerequisites: CHE 331; Chemical Engineering majors only or permission of instructor. S.

CHE 335. Chemical Engineering Summer Laboratory II, 3 Credits.
Experiments reinforcing physico-chemical principles, unit operations, separations, and mass and energy balances. Pre-design labs are also introduced. Prerequisites: CHE 201, CHE 206, CHE 315 and either CHE 232 or CHE 235; Chemical Engineering majors only or permission of instructor. SS.

CHE 380. Service Learning, 1-3 Credits.
Design and implementation of engineering-related projects to serve the community, including K-12 STEM outreach. Hands-on design experience by the student working as an individual or part of a team. Repeatable to 9 credits. S/U grading. F-S.

CHE 381. Experiential Learning, 1-3 Credits.
Hands-on design experience by student teams. May include interdisciplinary work on engineering student design competitions. Repeatable to 9 credits. S/U grading. F-S.

CHE 397. Cooperative Education, 1-2 Credits.
A practical work experience with an employer closely associated with the student's academic area. Arranged by mutual agreement among student, department and employer. Prerequisite: Sophomore standing in the chemical engineering degree program; Cumulative GPA of 2.0 or higher. Repeatable to 12 credits. S/U grading. F-S,SS.

CHE 403. Molecular Thermodynamics and Kinetics, 3 Credits.
A theoretical and mathematical understanding of statistical thermodynamics, quantum mechanics and kinetic theory of gases. Focus on estimating macroscopic thermodynamic and transport properties, equilibrium constants, and kinetic rate constants from a microscopic description of matter. Prerequisites: CHE 303 and CHE 321; CEM majors only or permission of instructor. F.

CHE 404. Air Emissions: Regulation and Control, 3 Credits.
This course is designed to enable engineers to understand natural and anthropogenic sources of air pollution, their impact on health and the environment, and learn ways to minimize air emissions by application of control practices. F.

CHE 406. Process Dynamics and Control, 3 Credits.
Dynamics and control of chemical processes and of systems. Prerequisites: MATH 266, CHE 206, and CHE 305; Chemical Engineering majors only or permission of instructor. F.

CHE 411. Plant Design I: Process Design and Economics, 4 Credits.
Introduction to how projects are executed in the process industries, including an understanding of what constitutes preliminary process design, preliminary cost estimation, the fundamentals of economics as applied to process economic assessment, sustainability considerations in design, oral written communications, teamwork, and the typical drawings and other deliverables produced during the scoping phase of process plant design. There is a particular emphasis on safety considerations in design. Prerequisites: CHE 303 and C or better in CHE 201, CHE 206, CHE 305 and CHE 321; Chemical Engineering majors only or permission of instructor. F.
CHE 412. Plant Design II: Process Project Engineering. 5 Credits.
Proficiency is gained in the development of the preliminary design for a major chemical process. In addition, this course provides an introduction to the second stage of process design— the conceptual design process including an introduction to Piping and Instrument-level design development, process control design and facility layout. A variety of oral communications skills are included. Prerequisites: CHE 408 and C or better in CHE 411; Chemical Engineering majors only or permission of instructor. S.

CHE 413. Plant Design II: Preliminary Process Project Engineering. 3 Credits.
Proficiency is gained in the development of the preliminary design for a major chemical process. A variety of oral communication skills are included. Prerequisites: CHE 411 with a C or better and CHE 408; Chemical Engineering majors only or permission of instructor. S.

CHE 414. Plant Design II: Conceptual Process Project Engineering. 2 Credits.
This course provides an introduction to the second stage of process design— conceptual design. Student will complete process-related components of a conceptual design for a major chemical process including Piping and Instrument Diagrams and Plant Layout Diagrams. A variety of oral communication skills are included. Prerequisites: CHE 413; Chemical Engineering majors only or permission of instructor. SS.

CHE 416. Chemical Product Design. 3 Credits.
Introduction to the design of chemical products. Topics include product development processes and methodologies, including StageGate and Design for Six Sigma (DFSS). Course contains both classroom and lab activities. Prerequisites: CHE 411, CHEM 340 and CHEM 340L or CHEM 341 and CHEM 341L; Chemical Engineering majors only or permission of instructor. S.

CHE 420. Capstone in Sustainable Energy. 1 Credit.
The student will work one-on-one with a faculty mentor to develop a concept paper on the primary issues facing the development and implementation of sustainable energy technologies. Prerequisite: Completion of 12 credit hours towards a Concentration in Sustainable Energy. S.

CHE 422. Capstone in Energetics. 1 Credit.
The student will work with a faculty mentor to develop a white paper on a major issue facing the development and implementation of energetics technologies. This will include a discussion of the technical, economic, political, and social barriers facing implementation of the selected technology(ies) plus plausible methodologies of overcoming these barriers. Prerequisite: Completion of, or concurrent enrollment in, 12 credit hours towards a concentration in Energetics. S.

CHE 424. Capstone in Petroleum Engineering. 1 Credit.
The student will work with a faculty mentor to develop a white paper on a major issue facing the development and implementation of petroleum engineering technologies. This will include a discussion of the technical, economic, political, and social barriers facing implementation of the selected technology(ies) plus plausible methodologies of overcoming these barriers. Prerequisites: Completion of or concurrent enrollment in 12 credit hours towards a Concentration in Petroleum Engineering; restricted to Chemical Engineering majors. S/U grading. S.

CHE 431. Chemical Engineering Laboratory IV. 3 Credits.
Laboratory study of the unit operations of Chemical Engineering. Prerequisites: CHE 305 and either CHE 332 or CHE 335; Chemical Engineering majors only or permission of instructor. F, SS.

CHE 435. Materials and Corrosion. 3 Credits.
Provides an introduction to the fundamental properties of metals and polymers, reviews the forms of metal corrosion and of polymer degradations. Prerequisite: CEM majors only or permission of instructor. S.

CHE 480. Undergraduate Research. 1-6 Credits.
Undergraduate research experience in chemical engineering under the guidance of a faculty member. Prerequisite: Consent of instructor. Repeatable to 12 credits. S/U grading. F, SS.

CHE 489. Senior Honors Thesis. 1-8 Credits.
Supervised independent study culminating in a thesis. Repeatable to 9 credits. Repeatable to 9 credits. F, SS.

CHE 493A. Special Topics. 1-3 Credits.
Special topics dictated by student request and current faculty interest. The particular course may be initiated by the students by contacting members of the faculty. Regular grading. Repeatable to 9 credits. Repeatable to 9 credits. On demand.

CHE 493B. Special Topics. 1-3 Credits.
Special topics dictated by student request and current faculty interest. The particular course may be initiated by the students by contacting members of the faculty. S/U grading. Repeatable to 9 credits. Prerequisite: Consent of instructor. Repeatable to 9 credits. S/U grading. On demand.

Bachelor of Science in Chemical Engineering

Required 130 credits (36 of which must be numbered 300 or above and 60 of which must be from a 4-year institution) including:

I. Essential Studies Requirements (see University ES listing).

II. The Following Curriculum:

Freshman Year

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CHE 102</td>
<td>2</td>
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<tr>
<td>CHEM 221 &amp; 221L</td>
<td>4</td>
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<tr>
<td>ENGL 110</td>
<td>3</td>
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<tr>
<td>MATH 165</td>
<td>4</td>
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<tr>
<td>Arts/Humanities ES</td>
<td>3</td>
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Second Semester

| CHE 103       | 3       |
| CHEM 254 & 254L | 4       |
| MATH 166      | 4       |
| PHYS 251      | 4       |
| Arts/Humanities ES | 3 |
|               | 18      |

Sophomore Year

<table>
<thead>
<tr>
<th>First Semester</th>
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<tr>
<td>CHE 201</td>
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<td>ENGL 130</td>
<td>3</td>
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<tr>
<td>LEAD 101</td>
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<tr>
<td>MATH 265</td>
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<td>PHYS 252</td>
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Second Semester

| CHE 206       | 3       |
| CHE 232       | 2       |
| CHE 315       | 3       |
| CHEM 340 & 340L | 5       |
| MATH 266      | 3       |
|               | 16      |

Junior Year

<table>
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<th>First Semester</th>
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<tr>
<td>CHE 301</td>
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<td>CHE 303</td>
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<td>CHE 331</td>
<td>2</td>
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<td>ENGR 206</td>
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<tr>
<td>Fine Arts Course</td>
<td>3</td>
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Second Semester

| CHE 305       | 3       |
| CHE 321       | 3       |
| CHE 332       | 2       |
| CHE 340       | 3       |
| Material Science Elective | 3 |

* 3
** 2
†† 1
### Concentration in Energetics

Energetics concepts are widely used in defense applications, as well as many other areas including space exploration, counter-terrorism, fire suppression and public safety technologies, automotive airbags, and fireworks. With defense and security representing important issues facing our nation today, there is a critical need to grow and optimize the research and development of energetic materials. Furthermore, it has become equally important to train replacements for the aging workforce in this important technological area. This program is designed to equip students for careers associated with sustainability and sustainable energy technologies.

To qualify for a Concentration in Energetics, a student must complete the requirements for the B.S. in Chemical Engineering. Requirements for the concentration are fulfilled by taking the following courses to meet the required electives of the B.S. ChE degree. In addition, one additional credit is required for the concentration: CHE 422 Capstone in Energetics: Capstone in Energetics.

Select one of the following (Social Electives):

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ANTH 171</td>
<td>Introduction to Cultural Anthropology</td>
<td>3</td>
</tr>
<tr>
<td>COMM 103</td>
<td>Information, Technology and Social Change</td>
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<tr>
<td>CJ 201</td>
<td>Introduction to Criminal Justice</td>
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<tr>
<td>ENGR 410</td>
<td>Technology Ventures</td>
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<tr>
<td>GEOG 161</td>
<td>World Regional Geography</td>
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<tr>
<td>ME 370</td>
<td>Engineering Disasters and Ethics</td>
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<tr>
<td>PHIL 130</td>
<td>Introduction to Political Philosophy</td>
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<td></td>
<td><strong>Total Credits</strong></td>
<td>16</td>
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</tbody>
</table>

### Concentration in Sustainability

Climate change, rising energy costs, and water-energy-food security represent some of the most significant issues facing today’s society. It will take major advances in technology to help resolve these issues. Additionally, energy-related issues have created a new industry with a strong need for the training and development of human capital. The concentration in Sustainability is designed to help students prepare themselves for careers associated with sustainability and sustainable energy technologies.

To qualify for a concentration in Sustainability, a student must complete the requirements for the B.S. in Chemical Engineering. Requirements for the concentration are fulfilled by taking the following courses to meet the required electives of the B.S. ChE degree. In addition, one additional credit is required for the concentration: CHE 420 Capstone in Sustainable Energy.

Material Science Elective:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CHE 435</td>
<td>Materials and Corrosion</td>
<td>3</td>
</tr>
<tr>
<td>ESSP 160</td>
<td>Sustainability &amp; Society</td>
<td>3</td>
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<tr>
<td>PHIL 253</td>
<td>Environmental Ethics</td>
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Select one of the following (Technical Elective I):

<table>
<thead>
<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>CHE 404</td>
<td>Air Emissions: Regulation and Control</td>
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</tr>
<tr>
<td>CHE 503</td>
<td>Fuels Technology</td>
<td></td>
</tr>
<tr>
<td>ESSP 420</td>
<td>Sustainable Energy</td>
<td></td>
</tr>
<tr>
<td>ESSP 450</td>
<td>Environmental and Natural Resource Economics</td>
<td></td>
</tr>
<tr>
<td>ESSP 460</td>
<td>Global Environmental Policy</td>
<td></td>
</tr>
<tr>
<td>EE 522</td>
<td>Renewable Energy Systems</td>
<td></td>
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<tr>
<td>ENGR 501</td>
<td>Energy, Resources and Policy</td>
<td></td>
</tr>
<tr>
<td>ENGR 502</td>
<td>Alternative Energy Systems</td>
<td></td>
</tr>
<tr>
<td>ENTR 386</td>
<td>Financials for Entrepreneurs</td>
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<tr>
<td>SPST 435</td>
<td>Global Change</td>
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Select one of the following (Technical Elective II):

<table>
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</thead>
<tbody>
<tr>
<td>GEOL 103</td>
<td>Introduction to Environmental Issues</td>
<td></td>
</tr>
<tr>
<td>GEG 121 &amp; 121L</td>
<td>Global Physical Environment &amp; Global Physical Environment Laboratory</td>
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</tr>
<tr>
<td>GEG 134 &amp; 134L</td>
<td>Introduction to Global Climate &amp; Introduction to Global Climate Laboratory</td>
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Select one of the following (Advanced Chemical Science Elective):

<table>
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<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CHEM 333</td>
<td>Analytical Chemistry &amp; 333L</td>
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<tr>
<td>CHE 480</td>
<td>Undergraduate Research</td>
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Capstone:

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<tr>
<td>CHE 420</td>
<td>Capstone in Sustainable Energy</td>
<td>1</td>
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</table>

**Total Credits**: 16
CHEM 116. Introduction to Organic and Biochemistry. 3 Credits.
Does not satisfy the prerequisite for any advanced chemistry course. A second semester of general chemistry with emphasis on organic and biochemistry. Includes alkanes, alkenes, aromatics, alcohol, phenols, ethers, aldehydes, ketones, carboxylic acids, esters, amines, amides, carbohydrates, lipids, amino acids, proteins, and nucleic acids. Required of students in the B.S. in Chemistry program. Prerequisites: CHEM 115 and CHEM 115L, or CHEM 121 and CHEM 121L; a minimum of a C in either course is required. F.S.

CHEM 116L. Introduction to Organic and Biochemistry Laboratory. 1 Credit.
Laboratory to accompany CHEM 116. Prerequisites: CHEM 115 and CHEM 115L, or CHEM 121 and CHEM 121L. Corequisite: CHEM 116. F,S.

CHEM 121. General Chemistry I. 3 Credits.
Open to all students; no high school credit in chemistry required. Elementary principles and theories of chemistry: matter, measurement, atoms, ions, molecules, reactions, chemical calculations, thermodynamics, bonding, molecular geometry, periodicity, gases. Prerequisite or Corequisite: MATH 103 or higher. F,S,SS.

CHEM 121L. General Chemistry I Laboratory. 1 Credit.
Laboratory to accompany CHEM 121. Prerequisite or Corequisite: CHEM 121. F,S,SS.

CHEM 122. General Chemistry II. 3 Credits.
Elementary principles and theories of chemistry: Intermolecular forces, liquids, solids, kinetics, equilibria, acids and bases. Solution of chemistry, precipitation, thermodynamics, electrochemistry. Prerequisite: CHEM 121 with a grade of C or better and CHEM 121L. F,S,SS.

CHEM 122L. General Chemistry II Laboratory. 1 Credit.
Laboratory to accompany CHEM 122. Prerequisite: CHEM 121 and CHEM 121L. Corequisite: CHEM 122. F,S,SS.

CHEM 221. Fundamentals of Chemistry - Concepts. 3 Credits.
Atomic and molecular structure, stoichiometry, states of matter, thermodynamics, periodicity and descriptive inorganic chemistry. Prerequisite: High school chemistry. Corequisite: CHEM 221L. Prerequisite or Corequisite: MATH 165. F.

CHEM 221L. Fundamentals of Chemistry Laboratory. 1 Credit.
Laboratory to accompany CHEM 221. Prerequisites: High school chemistry and MATH 103 or appropriate Math Placement score. Corequisite: CHEM 221. F.

CHEM 254. Inorganic Chemistry I. 3 Credits.
Required for chemistry majors. Chemistry of the elements with emphasis on occurrence, preparation, physical properties, chemical reactivity, uses, nomenclature, structure, and periodic behavior. Includes chemical kinetics and thermodynamics. Prerequisite: CHEM 222 or CHEM 221. Corequisite: CHEM 254L. S.

CHEM 254L. Inorganic Chemistry I Laboratory. 1 Credit.
Qualitative and quantitative inorganic chemistry, including precipitation, acid-base reactions, and redox reactions in aqueous solutions. The preparation and isolation of main-group element and transition metal compounds. The characterization of these compounds with standard chemical and instrumental methods. Determinations of the rates of chemical reactions and of bond parameters. Prerequisite: CHEM 122 or CHEM 221. Corequisite: CHEM 254. S.

CHEM 333. Analytical Chemistry. 3 Credits.
For all science majors interested in using analytical chemistry techniques in a modern science laboratory. Principles of quantitative and qualitative chemical analysis as applied to environmental, clinical and forensic science are covered. Prerequisite: CHEM 122 or CHEM 221. Corequisite: CHEM 333L. F.

CHEM 333L. Analytical Chemistry Laboratory. 1 Credit.
Laboratory to accompany CHEM 333. Principles of quantitative and qualitative chemical analysis as applied to environmental, clinical and forensic science are covered. Prerequisite: CHEM 122 or CHEM 254. Corequisite: CHEM 333. F.

CHEM 340. Survey of Organic Chemistry. 4 Credits.
For all students interested in a one-semester survey of organic chemistry. Structure and bonding, nomenclature; hydrocarbons: alkanes, alkenes, alkynes, aromatics; substituted hydrocarbons: alkyl halides, stereochemistry, alcohols, phenols, ethers, amines; carboxylic acids: aldehydes, ketones, carboxylic acids, esters, amides. Prerequisites: CHEM 122 with a grade of C or better and CHEM 122L; or CHEM 254 and CHEM 254L. Prerequisite or Corequisite: CHEM 340L or CHEM 341L. S.

The student's transcript will be marked with a Concentration in Sustainability upon completion of the recommended curriculum.
CHEM 340L. Survey of Organic Chemistry Laboratory. 1 Credit. Laboratory to accompany CHEM 340. Prerequisite: CHEM 122L or CHEM 254L. Corequisite: CHEM 340. S.

CHEM 341. Organic Chemistry I. 3 Credits. Designed for science and pre-professional students. Structure and bonding, acid-base reactions, nomenclature, stereochemistry, functional groups, alkanes, alkenes, alkynes, alkyl halides and alcohols. Application of spectrometric methods (NMR, IR and MS) for identification of organic compounds. Prerequisites: CHEM 122 with a grade of C or better and CHEM 122L; or CHEM 254 and CHEM 254L. Corequisite: CHEM 341L. F.

CHEM 341L. Organic Chemistry I Laboratory. 1 Credit. Laboratory to accompany CHEM 341. Required for chemistry majors. Prerequisite: CHEM 122L or CHEM 254L. Prerequisite or Corequisite: CHEM 341. F, S.

CHEM 342. Organic Chemistry II. 3 Credits. Designed for science and pre-professional students. Structure and reactivity, organometallic compounds, aldehydes, ketones, carboxylic acids and their derivatives, aromatic compounds, amines, multi-step synthesis. Prerequisite: CHEM 341 or CHEM 341C with a grade of C or better and CHEM 341L. Prerequisite or Corequisite: CHEM 342L. F, S.

CHEM 342L. Organic Chemistry II Laboratory. 1 Credit. Required for all chemistry majors. Laboratory to accompany CHEM 342. Prerequisite: CHEM 341. Prerequisite or Corequisite: CHEM 342. F, S.

CHEM 361. Problem Solving in Organic Chemistry I. 1 Credit. Reaction mechanisms and multi-step syntheses based on the reactions of alkenes, alkynes, alkyl halides and alcohols. Prerequisites: CHEM 122, with a grade of C or better and CHEM 122L; or CHEM 254 and CHEM 254L. Prerequisites or Corequisites: CHEM 341 and CHEM 341L. F.

CHEM 362. Problem Solving in Organic Chemistry II. 1 Credit. Reaction mechanisms and multi-step syntheses involving organometallic compounds, aldehydes, ketones, carboxylic acids and their derivatives, aromatic compounds and amines. Prerequisites: CHEM 341 with a grade of C or better, CHEM 341L, and CHEM 361. Corequisites: CHEM 342 and CHEM 342L. S.

CHEM 392. Special Problems in Chemistry. 1-3 Credits. An opportunity for students to be involved in research, teaching, and outreach activities under close faculty guidance. Prerequisite: Consent of Instructor. Repeatable to 6 credits. S/U grading. F, S.

CHEM 397. Cooperative Education. 1-2 Credits. An opportunity for students to be involved in research, teaching, and outreach activities under close faculty guidance. Prerequisite: Consent of Instructor. Repeatable to 6 credits. S/U grading. F, S.

CHEM 401. Selected Topics in Chemistry. 1-5 Credits. Repeatable with different topics. Repeatable. On demand.

CHEM 411. Instrumental Analysis I - Spectroscopy. 2 Credits. Topics ranging from the fundamentals of spectroscopic analysis to contemporary techniques (including atomic absorption spectroscopy, atomic emission spectroscopy, atomic fluorescence spectroscopy, UV-vis molecular spectroscopy, fluorescence molecular spectroscopy, and infrared spectroscopy) are explored in the classroom and in laboratory exercises. Prerequisites: CHEM 333 and CHEM 333L S, even years.

CHEM 442. Instrumental Analysis II - Electrochemistry. 2 Credits. Topics ranging from the fundamentals of electrochemistry (including thermodynamics, kinetics, and mass transfer) to contemporary techniques of electroanalysis (such as potentiometry, coulometry, amperometry, and voltammetry) are explored in classroom and laboratory exercises. Prerequisites: CHEM 333 and CHEM 333L. S, odd years.

CHEM 443. Instrumental Analysis III - Chromatography/Mass Spectrometry. 2 Credits. Topics involving the fundamentals of gas and liquid chromatography (GC and LC) and mass spectrometry (MS) as well as their practical considerations in the method development (including sample preparation and MS interpretation) are covered. The modern chromatographic techniques (GC, GC/MS, and high resolution MS) are explored in classroom and laboratory exercises. Prerequisites: CHEM 333 and CHEM 333L. F, odd years.

CHEM 454. Inorganic Chemistry II. 3 Credits. Chemistry of inorganic compounds in terms of modern theories and concepts. Prerequisites: CHEM 254 and CHEM 342. Corequisites: CHEM 454L. F.

CHEM 454L. Inorganic Chemistry II Laboratory. 1 Credit. A course in laboratory techniques as applied to inorganic systems, including modern methods for synthesizing inorganic compounds and their analyses by spectroscopic and diffraction techniques. Prerequisites: CHEM 254 and CHEM 254L. Corequisite: CHEM 454. F.

CHEM 455. Spectroscopy and Structure. 3 Credits. Applications of spectroscopic techniques to the determination of molecular structure. Prerequisite: CHEM 342 or CHEM 466. F.

CHEM 462. Physical Chemistry Laboratory. 3 Credits. Required for B.S. in Chemistry and B.S. with Major in Chemistry Physical Science Emphasis majors. The solution of chemical problems in the laboratory using modern physical and analytical methods. Prerequisites: CHEM 466. Prerequisite or Corequisite: CHEM 471. S.

CHEM 463. Advanced Synthesis Laboratory. 3 Credits. Advanced synthetic, separatory and characterization methods currently used in modern laboratory practice will be emphasized. Prerequisites: CHEM 462 or CHEM 467, and CHEM 455. S.

CHEM 466. Fundamentals of Physical and Biophysical Chemistry. 3 Credits. Required for students pursuing either a B.S. in Chemistry or a B.S. with a Major in Chemistry degree. Survey of topics in physical and biophysical chemistry with an emphasis for the life sciences. Topics include chemical thermodynamics, kinetics, introductory quantum mechanics, and spectroscopy. Prerequisites: CHEM 340 or CHEM 342, MATH 146 or MATH 165, and PHYS 212 or PHYS 252. F.

CHEM 466R. Fundamentals of Physical & Biophysical Chemistry Recitation. 1 Credit. CHEM 466R provides a biophysical perspective on material covered in CHEM 466. In addition, CHEM 466R introduces and uses Mathematica to solve some numerically challenging problems assigned in CHEM 466. Corequisite: CHEM 466. F.

CHEM 467. Survey of Physical Chemistry Laboratory. 2 Credits. Required for B.S. with a Major in Chemistry, Biochemistry Emphasis, majors. The solution of chemical problems in the laboratory using physical and biophysical methods. Prerequisite: CHEM 466. S.

CHEM 471. Quantum Mechanics & Spectroscopy. 3 Credits. Theory and nature of bonding and structure, spectroscopy, and optics. Prerequisites: CHEM 466, MATH 265, and PHYS 252. S.

CHEM 471R. Quantum Mechanics & Spectroscopy Recitation. 1 Credit. CHEM 471R is the Recitation/Discussion section of CHEM 471 to help students in developing essential skills in connecting Calculus, Physics and Chemistry. Prerequisites: CHEM 466, MATH 265, and PHYS 252. Corequisite: CHEM 471. S.

CHEM 475. Materials Chemistry. 3 Credits. Thermodynamics and kinetics, material chemistry, preparation methods and case studies in materials science. Prerequisites: CHEM 466 or PHYS 252, MATH 165. F.

CHEM 488. Undergraduate Seminar. 1 Credit. Required for B.S. in Chemistry. Introduction to current research in chemistry and to professional chemistry seminar preparation. Corequisite: CHEM 492 or CHEM 463. S.


CHEM 492. Senior Research. 1-3 Credits. An opportunity for advanced students to work on research problems under close faculty guidance. Prerequisite: CHEM 342. Prerequisite or Corequisite: CHEM 462 or CHEM 467. Repeatable to 6 credits. F, S, SS.

CHEM 495. Chemistry Capstone. 3 Credits. Designed for all senior students majoring in Chemistry. Discussion of current research topics in chemistry. Practice critical thinking skills and the knowledge gained in various chemistry courses to interpret and evaluate chemistry research data. Process information from different sources to provide an original interpretation of a given chemical phenomenon. Prepare a professional research paper and poster or oral presentation. Prerequisite or Corequisite: CHEM 462 or CHEM 467. S.
Bachelor of Science in Chemistry (ACS Certified Program)

Required 120 credits (36 of which must be numbered 300 or above and 30 of which must be from UND) including:

I. Essential Studies Requirements (see University ES guidelines and course listings).

II. The Following Curriculum:

Major Requirements—51 hours of Chemistry including:

### Freshman Year

<table>
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<tr>
<th>First Semester</th>
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<tbody>
<tr>
<td>CHEM 101</td>
<td>Orientation to Chemistry</td>
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<tr>
<td>CHEM 221 &amp; 221L</td>
<td>Fundamentals of Chemistry - Concepts</td>
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<tr>
<td>ENGL 110</td>
<td>College Composition I</td>
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<tr>
<td>MATH 165</td>
<td>Calculus I</td>
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<tr>
<td>Essential Studies and Other Electives</td>
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<td><strong>Credits</strong></td>
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<tr>
<th>Second Semester</th>
<th>Credits</th>
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<tr>
<td>CHEM 254 &amp; 254L</td>
<td>Inorganic Chemistry I and Inorganic Chemistry Laboratory</td>
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<tr>
<td>ENGL 130</td>
<td>Composition II: Writing for Public Audiences</td>
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<td>MATH 166</td>
<td>Calculus II</td>
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<td>CHEM 333 &amp; 333L</td>
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<td>CHEM 341 &amp; 341L</td>
<td>Organic Chemistry I and Organic Chemistry I Laboratory</td>
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<td>CHEM 361</td>
<td>Problem Solving in Organic Chemistry I</td>
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<td>PHYS 251</td>
<td>University Physics I</td>
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<td>MATH 265</td>
<td>Calculus III</td>
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<tr>
<td>CHEM 342 &amp; 342L</td>
<td>Organic Chemistry II and Organic Chemistry II Laboratory</td>
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<td>CHEM 362</td>
<td>Problem Solving in Organic Chemistry II</td>
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<td>PHYS 252</td>
<td>University Physics II</td>
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<th>Junior Year</th>
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<td>CHEM 454 &amp; 454L</td>
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<tr>
<td>CHEM 466</td>
<td>Fundamentals of Physical and Biophysical Chemistry</td>
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<tr>
<td>CHEM 443</td>
<td>Instrumental Analysis III - Chromatography/Mass Spectrometry</td>
</tr>
<tr>
<td>First Semester of a Foreign Language</td>
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<tr>
<td>Essential Studies and Other Electives</td>
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<tr>
<td><strong>Credits</strong></td>
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<table>
<thead>
<tr>
<th>Second Semester</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CHEM 441</td>
<td>Instrumental Analysis I - Spectroscopy</td>
</tr>
<tr>
<td>CHEM 471</td>
<td>Quantum Mechanics &amp; Spectroscopy</td>
</tr>
<tr>
<td>CHEM 471R</td>
<td>Quantum Mechanics &amp; Spectroscopy Recitation</td>
</tr>
<tr>
<td>CHEM 462</td>
<td>Physical Chemistry Laboratory</td>
</tr>
<tr>
<td>BMB 301</td>
<td>Biochemistry</td>
</tr>
<tr>
<td><strong>Credits</strong></td>
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<table>
<thead>
<tr>
<th>Senior Year</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CHEM 492</td>
<td>Senior Research</td>
</tr>
<tr>
<td>Essential Studies and Other Electives</td>
<td>9</td>
</tr>
<tr>
<td><strong>Credits</strong></td>
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<table>
<thead>
<tr>
<th>Second Semester</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CHEM 442</td>
<td>Instrumental Analysis II - Electrochemistry</td>
</tr>
<tr>
<td>CHEM 495</td>
<td>Chemistry Capstone</td>
</tr>
<tr>
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<td><strong>Total Credits</strong></td>
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</table>

1. If a student is not ready for MATH 165 Calculus I, the math sequence may be moved back one semester and MATH 107 Precalculus (also MATH 103 College Algebra, if needed) should be taken in the first semester.
2. Suggested electives are courses in Physics, Mathematics, Biology, Languages, Computer Science, Chemical Engineering, Business Management, and Speech.
3. Chem 44X (CHEM 441 Instrumental Analysis I - Spectroscopy, CHEM 442 Instrumental Analysis II - Electrochemistry and CHEM 443 Instrumental Analysis III - Chromatography/Mass Spectrometry) courses are offered within a regular, two-year cycle. Students can take Chem 44X courses in any order.
4. Other undergraduate and graduate level courses in Chemistry may be taken as electives.
5. Two semesters of a foreign language are required. If a student wishes to pursue Study Abroad, taking language courses earlier is recommended.

Bachelor of Science with Major in Chemistry

Required 125 credits (36 of which must be numbered 300 or above, and 60 of which must be from a 4-year institution) including:

I. Essential Studies Requirements (see University ES guidelines and course listings)

II. The Following Curriculum:

Major Requirements — 43 hours (Option A) or 40 hours (Option B) of Chemistry and Biochemistry including:

### Option A. Physical Science Emphasis

<table>
<thead>
<tr>
<th>Freshman Year</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CHEM 101</td>
<td>Orientation to Chemistry</td>
</tr>
<tr>
<td>CHEM 121 &amp; 121L</td>
<td>General Chemistry I and General Chemistry I Laboratory</td>
</tr>
<tr>
<td>ENGL 110</td>
<td>College Composition I</td>
</tr>
<tr>
<td>MATH 165</td>
<td>Calculus I</td>
</tr>
<tr>
<td>Essential Studies and Other Electives</td>
<td>2</td>
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<table>
<thead>
<tr>
<th>Second Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 122 &amp; 122L</td>
<td>General Chemistry II and General Chemistry II Laboratory</td>
</tr>
<tr>
<td>MATH 166</td>
<td>Calculus II</td>
</tr>
<tr>
<td>ENGL 130</td>
<td>Composition II: Writing for Public Audiences</td>
</tr>
<tr>
<td>Essential Studies and Other Electives</td>
<td>2</td>
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<td><strong>Credits</strong></td>
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<table>
<thead>
<tr>
<th>Sophomore Year</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 333 &amp; 333L</td>
<td>Analytical Chemistry and Analytical Chemistry Laboratory</td>
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</table>

### Option B. Biochemistry Emphasis

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>CHEM 121</td>
<td>General Chemistry I</td>
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<tr>
<td>CHEM 122 &amp; 122L</td>
<td>General Chemistry II and General Chemistry II Laboratory</td>
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<td>ENGL 110</td>
<td>College Composition I</td>
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<tr>
<td>MATH 165</td>
<td>Calculus I</td>
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<tr>
<td>Essential Studies and Other Electives</td>
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<table>
<thead>
<tr>
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<th>Credits</th>
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<tbody>
<tr>
<td>CHEM 123 &amp; 123L</td>
<td>General Chemistry III and General Chemistry III Laboratory</td>
</tr>
<tr>
<td>MATH 166</td>
<td>Calculus II</td>
</tr>
<tr>
<td>ENGL 130</td>
<td>Composition II: Writing for Public Audiences</td>
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<tr>
<td>Essential Studies and Other Electives</td>
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<table>
<thead>
<tr>
<th>Sophomore Year</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 333 &amp; 333L</td>
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Option B. Biochemistry Emphasis

**Freshman Year**

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CHEM 101</td>
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</tr>
<tr>
<td>CHEM 121 &amp; 121L</td>
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| Total Credits | 15 |

<table>
<thead>
<tr>
<th>Second Semester</th>
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<tbody>
<tr>
<td>CHEM 361</td>
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<tr>
<td>PHYS 251</td>
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<td>MATH 265</td>
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| Essential Studies and Other Electives | 2 |

| Total Credits | 17 |

**Sophomore Year**

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>CHEM 341 &amp; 341L</td>
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<tr>
<td>CHEM 362</td>
<td>1</td>
</tr>
<tr>
<td>PHYS 252</td>
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| Essential Studies and Other Electives | 6 |

| Total Credits | 16 |

<table>
<thead>
<tr>
<th>Second Semester</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CHEM 443</td>
<td>2</td>
</tr>
<tr>
<td>CHEM 471 &amp; 471L</td>
<td>3</td>
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<tr>
<td>CHEM 471R</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 482</td>
<td>3</td>
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</table>

| Second Semester of a Foreign Language | 4 |

| Essential Studies and Other Electives | 2,4 |

| Total Credits | 15 |

**Junior Year**

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CHEM 446</td>
<td>4</td>
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<tr>
<td>CHEM 447</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 462</td>
<td>3</td>
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</table>

| First Semester of a Foreign Language | 4 |

| Essential Studies and Other Electives | 4 |

| Total Credits | 15 |

<table>
<thead>
<tr>
<th>Second Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 444 &amp; 444L</td>
<td>2</td>
</tr>
<tr>
<td>CHEM 495</td>
<td>3</td>
</tr>
</tbody>
</table>

| Essential Studies and Other Electives | 4 |

| Total Credits | 15 |

| Total Credits | 125 |

1. If a student is not ready for MATH 165 Calculus I, the math sequence may be moved back one semester and MATH 107 Precalculus (also MATH 103 College Algebra, if needed) should be taken in the first semester.

2. Suggested electives are courses in Physics, Mathematics, Biochemistry, Biology, Computer Science, Chemical Engineering, Business Management, and Speech.

3. Chem 44X (CHEM 441 Instrumental Analysis I - Spectroscopy, CHEM 442 Instrumental Analysis II - Electrochemistry and CHEM 443 Instrumental Analysis III - Chromatography/Mass Spectrometry) courses are offered within a regular, two-year cycle. Students can take Chem 44X courses in any order.

4. Other undergraduate and graduate level courses in Chemistry may be taken as electives. One credit hour must be from either Special Problems in Chemistry (Chem 392) or Senior Research (Chem 492).

5. Two semesters of a foreign language are required. If a student wishes to pursue Study Abroad, taking language courses earlier is recommended.

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**Second Semester**

<table>
<thead>
<tr>
<th>CHEM 495</th>
<th>Chemistry Capstone</th>
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<tbody>
<tr>
<td>ENGL 130</td>
<td>Composition II: Writing for Public Audiences</td>
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</table>

| Total Credits | 15 |

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**Third Semester**

<table>
<thead>
<tr>
<th>CHEM 333</th>
<th>Analytical Chemistry</th>
<th>4</th>
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</thead>
<tbody>
<tr>
<td>CHEM 341</td>
<td>Organic Chemistry I</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 341L</td>
<td>and Organic Chemistry I Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>CHEM 361</td>
<td>Problem Solving in Organic Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>PHYS 211</td>
<td>College Physics I</td>
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</tbody>
</table>

| Essential Studies and Other Electives | 3 |

| Total Credits | 17 |

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**Fourth Semester**

<table>
<thead>
<tr>
<th>CHEM 446</th>
<th>Instrumental Analysis I - Spectroscopy</th>
<th>3</th>
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</thead>
<tbody>
<tr>
<td>CHEM 447</td>
<td>Quantum Mechanics &amp; Spectroscopy</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 471</td>
<td>Quantum Mechanics &amp; Spectroscopy Recitation</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 482</td>
<td>Physical Chemistry Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 482L</td>
<td>and Organic Chemistry I Laboratory</td>
<td>2</td>
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</table>

| Second Semester of a Foreign Language | 4 |

| Essential Studies and Other Electives | 3 |

| Total Credits | 15 |

---

**Fifth Semester**

<table>
<thead>
<tr>
<th>CHEM 467</th>
<th>Survey of Physical Chemistry Laboratory</th>
<th>2</th>
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</thead>
<tbody>
<tr>
<td>BMB 301</td>
<td>Biochemistry</td>
<td>3</td>
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</tbody>
</table>

| Second Semester of a Foreign Language | 4 |

| Essential Studies and Other Electives | 6 |

| Total Credits | 15 |

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**Sixth Semester**

<table>
<thead>
<tr>
<th>CHEM 495</th>
<th>Chemistry Capstone</th>
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</tr>
</thead>
<tbody>
<tr>
<td>ENGL 130</td>
<td>Composition II: Writing for Public Audiences</td>
<td>3</td>
</tr>
</tbody>
</table>

| Total Credits | 15 |

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# University of North Dakota
Minor in Chemistry

B.S. in Civil Engineering (p. 69)

Courses

CE 101. Introduction to Civil Engineering. 1 Credit.
Course will be a series of lectures, discussions and group projects, concerning the practice of civil engineering and sustainable design. Topics include scope of civil engineering practice, professional ethics, professional practice issues, sustainable engineering design concepts, communication skills, project management and team-working, literature searches and information gathering, and career planning. Exposure to Grand Challenges. Prerequisite: CE major or department permission. S/U grading. F.

CE 102. Professional Assessment and Evaluation. 1 Credit.
This course is designed for students with industrial experience. Students complete a portfolio documenting educational and work experiences for evaluation, and individualized curriculum plans are developed. Based on the assessment and evaluation, some civil engineering requirements may be waived. Prerequisites: Work experience and/or technical school training plus completion of CHEM 121, CHEM 121L, PHYS 251, and MATH 265. S/U grading. F,S,SS.

CE 103. Graphical Communication. 3 Credits.
Development of visualization, technical communication, and documentation skills. The course covers 3D AutoCAD geometric modeling using current methods and techniques commonly found in the industry and Civil 3D land systems design program. Fundamentals of land surface modeling and current surveying techniques will be taught in a combined lecture-laboratory format. On-campus students have access to necessary software programs through the CEM computer system. DEED students are required to download a free computer aided design software version from AUTODESK to their personal computer. Prerequisites: CE major and CE 101 or permission of department.

CE 301. Civil Engineering Laboratory I. 2 Credits.
Course involves lab experiences dealing with design of experiments; determining the properties of coarse and fine aggregates, concrete, asphalt, steel, and wood; and determining the properties of soil in terms of moisture content, specific gravity, grain size distribution, index properties, moisture-density relationships, and permeability. Students perform lab work in teams and write reports as a group and/or individually. Prerequisites: CE major, ENGR 203, and ENGL 110. Corequisites: MATH 321 and CE 412. F,SS.

CE 302. Civil Engineering Laboratory II. 2 Credits.
Course involves lab experiences dealing with design of experiments; fluid properties, flow measurements, open channel flow, pipe flow, and hydraulic machinery; and water and wastewater treatment topics such as BOD, total and suspended solids, water hardness, chlorination, alkalinity, coagulation, and jar testing. Students perform lab work in teams and communicate results in written reports and one oral presentation. Prerequisites: CE major, ENGR 203, and ENGL 110. Corequisites: MATH 321, CE 431, and CE 423. S,SS.

CE 306. Fluid Mechanics. 3 Credits.
Fluid properties; fluid statics and dynamics; transport theory and transport analogies, conservation of mass, energy, and momentum; dimensional analysis; boundary layer concepts; pipe flows; compressible flow; open channel flow. Prerequisites: PHYS 251 and MATH 265. F,S.

CE 313. General Surveying. 2 Credits.
Measurements of distances and angles, EDM, satellite and inertial systems, triangulation, differential leveling, horizontal curves, vertical curves, traverse surveys, U.S. public land surveys, earthwork, boundary surveys and construction surveys. Basic knowledge of geometry and trigonometry required. Prerequisites: MATH 165 and CE 101 or permission of the department. Corequisite: On campus students must take CE 313L along with this class. F.

CE 313L. General Surveying Laboratory. 1 Credit.
Course will involve laboratory assignments dealing with measurements of distances and angles; use of EDM, GPS, and automatic levels; traversing; leveling; horizontal curves; vertical curves; and topographic survey. Offered in Summer for DEDP students. Prerequisite: DEED students must have completed CE 313. Corequisite: On-campus students must be enrolled in CE 313. F.

CE 351. Structural Mechanics. 4 Credits.
Reactions, shear and bending moment, plane and space trusses, influence lines, deflections, virtual work, energy methods, approximate analysis, consistent deformations method, slope deflection and moment distribution methods, introduction to matrix methods. Use of computer for analysis. Prerequisite: ENGR 203. F.

CE 397. Cooperative Education. 1-8 Credits.
A practical work experience with an employer closely associated with the student’s academic area. Arranged by mutual agreement among student, department and employer. Repeatable to 24 credits. Prerequisite: Admission to the civil engineering program or consent of advisor. Repeatable to 24 credits. F,S,SS.

CE 412. Soil Mechanics. 3 Credits.
Course topics include principles of soil mechanics including weight-volume relationships, classification, compaction, effective stress, permeability and seepage, consolidation, shear strength, site exploration, introduction to lateral earth pressure, and slope stability. Prerequisite: ENGR 203. F.

CE 414. Foundation Engineering. 3 Credits.
Soil improvements and ground modifications, soil exploration and sampling, bearing capacity, spread footings, mat foundations, settlement analysis, drilled shaft and pile foundations, foundations on difficult soil. Prerequisite: CE 412. S.

CE 416. Transportation Engineering. 3 Credits.
Introduction to highway engineering, traffic analysis, and transportation systems; road vehicle performance; highway, vehicle, and driver characteristics; highway capacity and level of service analysis; level of service analysis for signalized intersections; principles of traffic flow; geometric design of highways; pavement design and drainage; highway safety and transportation planning; and group design project. Prerequisite: CE 412. S.

CE 421. Hydrology. 3 Credits.
Course topics include measurement, interpretation, analysis and application of hydrologic data; precipitation, evaporation and transpiration; runoff hydrographs; routing methods; groundwater; and snow hydrology. Computer applications. Prerequisite: CE 306. F.
CE 432. Environmental Engineering II. 3 Credits.
Water distribution networks, mass curve analysis, wastewater collection systems, pumping systems for water and wastewater, system design project, computer-assisted design, confined spaces. Prerequisite: CE 306. F.

CE 434. Environmental Engineering Laboratory. 4 Credits.
Physical, chemical and biological methods used in environmental engineering, water chemistry, instrumental methods, lab tours. On demand.

CE 435. Hazardous Waste Management. 3 Credits.
Regulations, generation, storage, transportation, disposal, classification, fate and transport of contaminants, environmental audits, pollution prevention and management facilities, remediation alternatives, physical-chemical treatment, bioremediation, stabilization/solidification, thermal processes. Prerequisites: CE 306 and CHEM 121. S.

CE 444. Contracts and Specifications. 3 Credits.
Engineering contracts and specification essentials, legal aspects of engineering practice and employment; professional practice issues; procurement of work; governmental regulation. S.

CE 451. Steel Design. 3 Credits.
Material properties of reinforced concrete ingredients; mix design of ordinary and high performance concrete; loads and load factors; introduction to the working stress method in reinforced concrete; analysis and strength design of reinforced concrete beams in bending, shear, and development length; design of one way slabs; serviceability requirements for deflection and cracking; axially and eccentrically loaded reinforced concrete columns. The design process is based on ACI 318 building code. Prerequisite: CE 351. S.

CE 453. Reinforced Concrete. 3 Credits.
Selection of sections, bolted and welded connections, trusses, bearings, light gauge structural members, fatigue of structural members and introduction to plastic design. Prerequisite: CE 351. S.

CE 482. Civil Engineering Design I. 3 Credits.
This is a comprehensive design course which integrates engineering design and engineering science components of previous and ongoing coursework into a major design experience. Design projects can be in the areas of environmental, geotechnical, structural, water resources, or transportation engineering. Course activities include defining the problem, formulating project objectives, gathering background information, scheduling the project, applying design standards and realistic constraints; developing design alternatives; and evaluating design alternatives. Other topics covered include project management, effective team-working, professional ethics, and applications of graphical communication. Group design reports and individual oral presentations are required. Prerequisites: Two of these four: CE 451, CE 412, CE 423 and CE 431. F.

CE 483. Civil Engineering Design II. 3 Credits.
This is a comprehensive design course which integrates engineering design and engineering science components of previous and ongoing coursework into a major design experience. Design projects can be in the areas of environmental, geotechnical, structural, water resources, or transportation engineering. Course activities include developing and analyzing a detailed design, preparing plans and drawings using graphical communication tool(s), developing design specifications, and estimating construction costs. Other topics include principles of sustainability in design, and professional licensure and professional practice issues. Group design reports and individual oral presentations are required. Prerequisites: CE 482 or departmental consent. S.

CE 490. Special Topics. 1-3 Credits.
Investigation of special topics dictated by student and faculty interests. Repeatable. Prerequisite: Department approval. Repeatable. F.S.

Bachelor of Science in Civil Engineering

Required 128 credits (36 of which must be numbered 300 or above, and 60 of which must be from a 4-year institution) including:

I. Essential Studies Requirements (see University ES listing).

II. The Following Curriculum:

Freshman Year

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CE 101</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 121</td>
<td>4</td>
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<tr>
<td>ENGL 110</td>
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<td>MATH 165</td>
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Second Semester

<table>
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<tr>
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<tbody>
<tr>
<td>CE 103</td>
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<td>ENGL 130</td>
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<td>ENGR 200</td>
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<td>MATH 166</td>
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Sophomore Year

<table>
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<tr>
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<tbody>
<tr>
<td>CE 313</td>
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<td>CE 313L</td>
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<td>ENGR 201</td>
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<tr>
<td>GEOF 203</td>
<td>3</td>
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<tr>
<td>MATH 265</td>
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Second Semester

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<td>ENGR 203</td>
</tr>
<tr>
<td>MATH 266</td>
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<td>MATH 321</td>
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<td>PHYS 252</td>
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Junior Year

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<tbody>
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<td>CE 301</td>
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<td>CE 306</td>
<td>3</td>
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<tr>
<td>CE 351</td>
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<td>CE 412</td>
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<td>CHE 340 or ME 370</td>
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Second Semester

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<tr>
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<tbody>
<tr>
<td>CE 302</td>
</tr>
<tr>
<td>CE 423</td>
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<td>CE 431</td>
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<td>CE 451</td>
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<td>Technical Elective</td>
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**Senior Year**

**First Semester**

- CE 421 Hydrology 3
- CE 432 Environmental Engineering II 3
- CE 453 Reinforced Concrete 3
- CE 482 Civil Engineering Design I 3
- ENGR 460 Engineering Economy 3
- Essential Studies 3

<table>
<thead>
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<th>Credits</th>
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**Second Semester**

- CE 414 Foundation Engineering 3
- CE 416 Transportation Engineering 3
- CE 444 Contracts and Specifications 3
- CE 483 Civil Engineering Design II 3
- Technical Elective 3

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**Total Credits** 125-128

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**Communication Program (Comm)**

B.A. with Major in Communication (p. 71)

Minor in Communication (p. 72)

Specialization in International/Intercultural Communication (p. 72)

**Courses**

**COMM 102. Introduction to Communication. 3 Credits.**
Introduces students to the discipline of Communication. Surveys a broad range of sub-disciplines, including social media, strategic communication, human interactions, newswriting, communication technology, media and communication policies, and digital media production. F,S,SS.

**COMM 110. Fundamentals of Public Speaking. 3 Credits.**
The theory and practice of public speaking with emphasis on content, organization, language, delivery, and critical evaluation of messages. Additional emphasis on student performance stressing original thinking, effective organization, and direct communication of ideas. F,S,SS.

**COMM 200. Writing for New and Traditional Media. 3 Credits.**
Introduction to the various styles and forms required to effectively write content for existing and emerging media platforms, including the fundamentals of public relations, advertising, and reporting. F,S,SS.

**COMM 206. Digital Communication: Fundamentals. 3 Credits.**
An introduction to the theory and practice of digital communication for print, online and mobile media. Course emphasis is on a holistic approach to digital design including both theoretical knowledge and software expertise. Course involves creating a series of portfolio-ready digital artifacts. F.

**COMM 212. Interpersonal Communication. 3 Credits.**
Introduces fundamental concepts of communication between individuals. Explores aspects of self expression and relationship communication. To give insights into the dynamics of interpersonal communication. To aid in the understanding of how people present themselves to other people, and how others perceive them in return. F,S,SS.

**COMM 246. News Writing Fundamentals in the Online World. 3 Credits.**
Professional techniques of news gathering, editing, source analysis, and information dissemination. Explores the potential for diverse and evolving technologies and platforms to deliver news content in a connected world. Prerequisites: COMM 200 or instructor consent. F,S.

**COMM 294. Individual Research. 1-4 Credits.**
Introductory experience as a research assistant on a research team. A total of 45 hours is required over the course of the semester/term per credit. Prerequisite: Consent of Instructor. Repeatable to 4 credits. S/U grading. F,S,SS.

**COMM 305. Audio Production & Broadcasting. 3 Credits.**
Investigates audio-related aspects of communication in digital sound production and broadcast dissemination. Beginning with the basic principles of audio, the course examines modern means of capturing, editing, and producing high-quality audio for the web and mobile devices, podcasting, and includes the use of a variety of software packages, plugins, and platforms. F,S.

**COMM 310. Media and Diversity. 3 Credits.**
Study of minority status within mass media organizations and in media content from historical, contemporary and speculative points of view. F.

**COMM 313. Persuasion. 3 Credits.**
An examination of principles and practices of persuasion and its influence across communication contexts. Emphasis will be placed on ethical standards and implications of persuasion and influence. F,S.

**COMM 319. Digital Imaging Across Platforms. 3 Credits.**
Introduces the history and practice of digital imaging for social media and communication industries, including introductory photographic principles, digital image capture devices, and software, apps, and workflows. Students learn to enhance/optimize digital images for transmission/broadcast to the web, social networks, and other platforms. F,S.

**COMM 324. Feature and Opinion Writing. 3 Credits.**
Investigative reporting and writing for traditional and new media using innovative research and source analysis techniques. Includes methods for informed opinion and commentary writing. Prerequisites: COMM 200 or consent of instructor. S.

**COMM 326. Content Creation for Social Media. 3 Credits.**
Focuses on writing, creating, and curating professional content for diverse social media platforms with the goal of engaging users, delivering messages and building relationships. Prerequisites: COMM 200 or consent of instructor. F,S.

**COMM 328. Community Journalism. 3 Credits.**
Considers the role that news media can play in enhancing community life. May focus on the role of print and broadcast journalism in Native American communities, on the role of weekly newspapers in small, rural towns or on broadcast and print media in cities. Provides an in-depth introduction to an assessment of efforts to determine how new forms of news media could provide innovative service for communities. Prerequisite: COMM 200 or consent of instructor. S.

**COMM 339. Digital Video Production. 3 Credits.**
This course offers an introduction to the theory and practice of modern digital video production utilizing a variety of production software techniques, industry best practices, and online/mobile technologies. F,S.

**COMM 345. Social Media Strategy. 3 Credits.**
This course focuses on scholarly and commercial aspects of social media strategy as a Communicative practice. In particular, course topics include a variety of social media driven outcomes including social activism, constituent engagement, outreach and advocacy, reputation management, analytics and optimization, and enhancing the quality and impact of message transmission in the social online environment. S.

**COMM 346. Sports Communication. 3 Credits.**
Introduces students to sports communication through an examination of athletics-related aspects of public relations, journalism, digital communication, organizational, and professional/executive communication. A significant component of the course focuses on aligning digital Communication technologies towards sports including digital imaging at games, sports writing, researching and reporting, web layout and presentation, public speaking/press releases etc. S.
COMM 352. Writing for Advertising & Public Relations. 3 Credits.
Intensive practice in preparing, planning and writing the materials used in public relations, with a special emphasis on engaging the media as well as internal and external target audiences. Prerequisites: COMM 200 or consent of instructor. F.S.

COMM 360. Communicating Science. 3 Credits.
This class is designed for upper-division students in the physical, biological, social, health and engineering sciences interested in science communication. It combines findings from research into information processing with best practices in media production to build student competency in communicating about science, scientific discoveries and the scientific process to general audiences through various media, as well as more specific audiences, such as funding organizations and policymakers. Students end the semester by producing a piece of science communication for a course-created website. Prerequisite: Junior or senior status (60+ hours). F.

COMM 374. Principles of Strategic Communication. 3 Credits.
This course introduces the fundamental theories, concepts, and applications of strategic communication to critically analyze its social influence and meet organizational goals. F.

COMM 380. Health Communication. 3 Credits.
Introduces theories and practices of health communication. Explores health communication with interpersonal sources (e.g., physicians other providers), groups (e.g., support groups healthcare organizations), and effective communication through mass media and digital/social media channels. F.

COMM 394. Readings/Projects in Communication. 1-6 Credits.
Individual projects or directed study related to topics, issues, or activities in communication. Prerequisite: Consent of Instructor. Repeatable to 6 credits. F,S,SS.

COMM 401. Organizational Communication. 3 Credits.
Analysis of communication behavior in formally structured relationships as it relates to the organization and to individuals. Special attention given to organizational style, status, trust and conflict-management. Informal communication networks and rumor are studied. S.

COMM 402. Intercultural/International Communication. 3 Credits.
This course will provide an overview of the study of intercultural and international communication. Topics addressed will include: history, literature, and culture of specific groups including racial, religious, and ethnic issues that affect communication patterns and outcomes. S.

COMM 404. Advertising and Society. 3 Credits.
Examines and evaluates the social, ethical and economic aspects of advertising. Attention is given to appraising the effects of advertising on the consumer and competition. F.

COMM 405. Social Implications of the Information Society. 3 Credits.
Considers and evaluates different perspectives on the information society, ranging from humanistic and Neomarxist critiques to the optimistic scenarios of some futurists. Examines the implications of new means of creating, storing, manipulating and disseminating information. Discussion of whether or not the potential benefits will be realized. S.

COMM 406. Future of Communication Technology. 3 Credits.
Evaluates different perspectives on the future of communication technology, ranging from utopian through dystopian views of the impact of communication technologies on modern society. Examines the implications of new means of creating, storing, manipulating and disseminating communication information, and analysis of whether potential benefits may be realized. This course is also offered for graduate credit. F.S.

COMM 410. Senior Capstone in Communication. 3 Credits.
Provides students with the opportunity to enrich their knowledge of communication and hone their analytic, research, and writing skills. Students will create content that are relevant to their desired professions or career paths and test its effectiveness by conducting appropriate research. Prerequisites: COMM 102, COMM 110, COMM 200, and at least 75 credits completed. F,S,SS.

COMM 430. AD/PR Campaigns. 3 Credits.
Provides students an opportunity to apply their knowledge and skills in strategic communication to a real-client situation. The essentials of developing and executing a campaign are covered, including market and audience research, positioning, traditional and social media strategies, budgeting, public relations programs, creative strategies, actual execution, and evaluation of the campaign. S.

COMM 451. Risk and Crisis Communication. 3 Credits.
This course explores identifying risks to organizational goals and key stakeholders, and communicating effectively during crisis events to maintain organizational legitimacy. Risk and crisis key theories and concepts, applications and analysis are addressed. Prerequisite: COMM 200 or consent of instructor. S.

COMM 493. Instructional Experiences in Communication. 2 Credits.
Intensive practice in preparing, planning and writing the materials used in public relations to critically analyze its social influence and meet organizational goals. F.

COMM 494. Advanced Individual Research. 1-4 Credits.
Advanced experience as a research assistant on a research team. A total of 45 hours is required over the course of the semester per credit. Prerequisite: Consent of Instructor. Repeatable to 8 credits. S/U grading. F,S,SS.

COMM 497. Internship. 1-3 Credits.
Supervised experience consistent with student's career objectives. Formal application in advance of internship needs department approval. Prerequisites: Consent of Instructor. Repeatable to 6 credits. S/U grading. F,S,SS.

COMM 499. Special Topics. 1-3 Credits.
Selected topics in communication that allow students to study specific communication issues and/or topics that are not covered by regular department offerings. Repeatable to 6 credits. Repeatable to 6 credits. On demand.

Bachelor of Arts with Major in Communication

Required 120 credits (36 of which must be numbered 300 or above, and 30 of which must be from UND including):

I. Essential Studies Requirements (see University Essential Studies listing.)

II. Major Requirements

Required minimum of 33 credits. A grade point average of 2.2 is required on all Communication courses, and a C or better in each course used for the 33-credit major.

Major Course Requirements

12 credits required

<table>
<thead>
<tr>
<th>Course</th>
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<td>Fundamentals of Public Speaking</td>
<td>3</td>
</tr>
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<td>COMM 200</td>
<td>Writing for New and Traditional Media</td>
<td>3</td>
</tr>
<tr>
<td>COMM 410</td>
<td>Senior Capstone in Communication (junior or senior status required)</td>
<td>3</td>
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Total Credits 12

Experience

3 credits required. Only 9 credits from these courses can be counted toward the 33-credit major. No more than 12 credits can be counted toward the 120 credits required for the degree.

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<td>Individual Research</td>
<td>1-4</td>
</tr>
<tr>
<td>COMM 394</td>
<td>Readings/Projects in Communication (Consent of Instructor)</td>
<td>3-6</td>
</tr>
<tr>
<td>COMM 493</td>
<td>Instructional Experiences in Communication</td>
<td>2</td>
</tr>
<tr>
<td>COMM 494</td>
<td>Advanced Individual Research</td>
<td>1-4</td>
</tr>
<tr>
<td>COMM 497</td>
<td>Internship</td>
<td>1-3</td>
</tr>
</tbody>
</table>
Electives: Students must complete an additional 18 credits of COMM coursework. Note: Some courses may have prerequisites; check individual course descriptions. A total of 3 credits of upper-division (i.e., 300- or 400-level) coursework in PSYC can be applied to this 18-credit requirement.

Specialization:

Undergraduate students in the Communication Program at UND may choose to acquire an International/Intercultural Communication specialization.

In order to achieve this written designation on their undergraduate transcript, students in Communication must earn the following additional credits:

**Level IV Foreign Language Proficiency**

<table>
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<tr>
<td>LANG 101</td>
<td>First Year Foreign Language I</td>
<td>4</td>
</tr>
<tr>
<td>LANG 102</td>
<td>First Year Foreign Language II</td>
<td>4</td>
</tr>
<tr>
<td>LANG 201</td>
<td>Second Year Foreign Language I</td>
<td>4</td>
</tr>
<tr>
<td>LANG 202</td>
<td>Second Year Foreign Language II</td>
<td>4</td>
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</table>

**Study Abroad Experience**

Choose one of the following:

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>LANG 318</td>
<td>Individual Arranged Study Abroad</td>
<td>1-12</td>
</tr>
<tr>
<td>LANG 319</td>
<td>University Sponsored Study Abroad</td>
<td>1-12</td>
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</table>

**Complete the Following Communication Courses**

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<tr>
<td>COMM 310</td>
<td>Media and Diversity</td>
<td>3</td>
</tr>
<tr>
<td>COMM 402</td>
<td>Intercultural/International Communication</td>
<td>3</td>
</tr>
<tr>
<td>COMM 497</td>
<td>Internship</td>
<td>1-3</td>
</tr>
</tbody>
</table>

Scholarship funding will be made available by the Communication Program on a competitive basis for students in this specialization, to assist with study abroad expenses.

**Minor in Communication**

Required: 21 credits (3 required courses and 12 elective credits).

Students must complete:

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<tr>
<td>COMM 200</td>
<td>Writing for New and Traditional Media</td>
<td>3</td>
</tr>
</tbody>
</table>

Students must complete 12 additional credits from COMM coursework

Note: Some courses may have prerequisites; check individual course descriptions

**Specialization in International/Intercultural Communication**

Undergraduate students in the Communication Program at UND may choose to acquire an International/Intercultural Communication specialization.

In order to achieve this written designation on their undergraduate transcript, students in Communication must earn the following additional credits:

**Level IV Foreign Language Proficiency**

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**Study Abroad Experience**

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**Complete the Following Communication Courses**

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<td>1-3</td>
</tr>
</tbody>
</table>

Scholarship funding will be made available by the Communication Program on a competitive basis for students in this track, to assist with study abroad expenses.

**Communication Sciences and Disorders (CSD)**

B.A. with Major in Communication Sciences and Disorders (p. 73)

**Courses**

CSD 223. Phonetics. 3 Credits.

Introduction to Phonetics. Includes articulatory descriptions of the speech sounds of English and other language, the International Phonetic Alphabet, coarticulatory phenomena, suprasegmentals, phonological features and phonological processes. Supervised practice in broad and narrow transcription of normal and disordered speech is provided. F.

CSD 231. Anatomy and Physiology of the Speech and Hearing Mechanism. 4 Credits.

Structure and function of the mechanisms involved in breathing, phonation, resonance, articulation and hearing. F.

CSD 232. Survey of Communication Disorders. 3 Credits.

Speech disorders: causes, symptoms, diagnosis and therapy of the common speech defects. F.

CSD 235. Speech and Hearing Science. 4 Credits.

An introduction to the normal processes of speech, hearing and language through the study of basic speech and hearing science exploring the scientific investigation of the physiological and acoustical parameters of speech. Prerequisites: CSD 231 and CSD 223, and MATH 103 or consent of instructor. S.

CSD 333. Speech Sound Development and Disorders. 3 Credits.

Development, etiology, diagnoses and management of phonological and articulation disorders. Prerequisite: CSD 223. S.

CSD 340. Normal Language Structure. 3 Credits.

The purpose of this course is to learn to analyze the grammar of English, focusing on morphology and syntax. The knowledge gained will serve as a foundation for the analysis of normal and impaired language. Prerequisite: ENGL 209 or equivalent. S.

CSD 343. Language Development. 3-4 Credits.

The nature and development of linguistic content, form, and use from birth to adulthood are studied relative to the development of communication and speech; relative to cognitive, social, and physical development; and relative to cultural diversity. Prerequisites or Corequisites: ENGL 209, PSYC 250, and CSD 340; or equivalents. F.

CSD 343L. Language Development Laboratory. 2 Credits.

Laboratory component of CSD 343. Prerequisite or Corequisite: CSD 343. F.

CSD 400. School Programs in Speech-Language-Hearing. 3 Credits.

This course covers the educational model of service delivery and how the speech-language pathologist works collaboratively in a school setting to meet the needs of students with speech, language, and hearing disabilities. Prerequisite: CSD 333 and CSD 343. F.

CSD 422. Neuroanatomy of Communication Disorders. 3 Credits.

A study of the essentials that form the basis for neuroanatomy, neurophysiology, neuropharmacology, and neurology, with a special section of study dealing with the neurological bases for speech, language and hearing. Prerequisite: CSD 231. S.

CSD 425. Language, Multiculturalism and Communication Disorders. 3 Credits.

Study of language structure and its interaction with culture from the perspective of the concept of world view, and the application of this relationship to the practice of speech-language pathology. Prerequisites: ENGL 209, CSD 223 and 343. Corequisite: CSD 440. F.
CSD 431. Introduction to Audiology. 3 Credits.
Elementary structure and function of the hearing mechanism; basic psychophysical dimensions of the auditory mechanism; types of deficient hearing; pure tone threshold and screening audiometry. Students are required to do hearing testing to qualify for certification in speech and hearing. Prerequisites: CSD 231 and CSD 235, and MATH 103. F.

CSD 434. Aural Rehabilitation. 3 Credits.
Principles, techniques and clinical practice in the diagnosis and rehabilitation of hearing disorders in children and adults; auditory training, speech reading and hearing conservation. Prerequisites: CSD 431 and CSD 343, or consent of instructor. S.

CSD 343L. Language-Hearing Association. 3 Credits.
Accreditied by the Council on Academic Accreditation of the American Speech-Language-Hearing Association. The Department of Communication Sciences and Disorders is experience is under the direct supervision of departmental faculty who hold the credentials of registered audiological practitioners and speech-language pathologists. The Clinic provides an opportunity for students to gain practical experience in speech, language, hearing conservation. Prerequisites: CSD 315 and consent of instructor. Repeatable to 9 credits. F,S,SS.

Total Credits 54-55

B. Major courses not required for the B.A., but recommended:

COMM 110 Fundamentals of Public Speaking 3
PSYC 303 Research Methods in Psychology 4

Total Credits 7

C. Courses required in other departments:

PSYC 241 Introduction to Statistics 4
PSYC 250 Developmental Psychology 4
PSYC 270 Abnormal Psychology 3
ENGL 209 Introduction to Linguistics 3
MATH 103 College Algebra (or higher) 3

Select one of the following (Gerontology):

PSYC 355 Adulthood and Aging 3
SOC 352 Aging and Society 3
SWK 313 Orientation to Gerontology 3

Select one of the following (Physics or Chemistry):

PHYS 130 Natural Science-Physics 3
PHYS 140 Physics for Poets 3
PHYS 211C College Physics I 3
CHEM 115 Introductory Chemistry 3
CHEM 121 General Chemistry I 3

Total Credits 23

D. Courses Required for Teacher Certification:

CSD 585 Practicum in the School Setting 10
T&L 433 Multicultural Education 3
or CSD 425 Language, Multiculturalism and Communication Disorders 3

Graduate students can choose courses from the list of 300-level courses above or from the higher level courses listed below:

SPED 510 Introduction to Early Childhood Special Education 3
SPED 511 Identification and Assessment of Young Children with Special Needs 3
SPED 512 Methods and Materials for Preschool Children with Special Needs 3
SPED 514 Intervention Strategies with Infants and Toddlers 3
T&L 530 Foundations of Reading Instruction 3-4

Speech, Language and Hearing Clinic

The Clinic provides an opportunity for students to gain practical experience in speech and language evaluation and treatment procedures as student clinicians and provides a basis for research in the clinical process. This experience is under the direct supervision of departmental faculty who hold the Certificate of Clinical Competence of the American Speech-Language-Hearing Association. The Department of Communication Sciences and Disorders is accredited by the Council on Academic Accreditation of the American Speech-Language-Hearing Association.
Services provided include evaluation and treatment of individuals with all types of speech and language disabilities and hearing impairments (including evaluations for hearing aid candidacy). Referrals to the Clinic may be made by anyone, and treatment is provided for individuals of all ages.

School of Electrical Engineering and Computer Science (EECS)

College of Engineering & Mines
B.S. with Major in Computer Science (p. 78)
B.S. in Data Science (p. 77)

College of Arts and Sciences
B.A. with Major in Computer Science (p. 77)
Minor in Computer Science (p. 78)
Minor in Cyber Security (p. 78)
Optional Specializations (p. 78)

CSCI Courses

CSCI 101. Introduction to Computers. 3 Credits.
An overview of the fundamental concepts and applications of computer science. Topics include data storage, hardware, operating systems, and programming principles. Corequisite: CSCI 101T is recommended. F,S,SS.

CSCI 110. Introduction to Computer Science. 3 Credits.
This is an introductory course for prospective computer science majors as well as offering an introduction to computing for non-computer science majors. Students will receive a broad introduction to the discipline of computer science without the immersion into a programming language. Students will learn to write interactive Web-based programs. No previous computing or programming experience is assumed. F,S,SS.

CSCI 120. Computer Programming I. 4 Credits.
An introduction to computer programming in a high-level language, with emphasis on problem solving and logical thinking. Students learn to design, implement, test, and debug programs for small-scale problems using elementary data types and control structures. Includes laboratory. On demand.

CSCI 130. Introduction to Scientific Programming. 4 Credits.
An introduction to scientific computing, with problem solving, algorithm development, and structured programming in a high-level language with an engineering and mathematical focus. Emphasis on learning how to design, code, debug, and document programs, using techniques of good programming style. Includes laboratory. F,S,SS.

CSCI 160. Computer Science I. 4 Credits.
An introduction to computer science, with problem solving, algorithm development, and structured programming in a high-level language. Emphasis on learning how to design, code, debug, and document programs, using techniques of good programming style. Includes laboratory. F,S,SS.

CSCI 160L. Computer Prog I Lab.
Computer Programming I Lab.

CSCI 161. Computer Science II. 4 Credits.
A broadening of foundations for computer science with advanced concepts in computer programming. Includes an introduction to data structures, analysis of algorithms, and the theory of computation. Includes laboratory. Prerequisites: CSCI 130 with a grade of C or better or CSCI 160 with a grade of C or better, and MATH 103 or MATH 107; concurrent enrollment in MATH 208 is recommended. S.

CSCI 161L. Computer Prog II Lab.
Computer Programming II Lab.

CSCI 170. Computer Programming II. 4 Credits.
Advanced techniques in computer programming using a high-level language. Topics include the use of recursion, pointers, and fundamental data structures in developing small to medium-scale programs. Includes laboratory. Prerequisite: CSCI 120. On demand.

CSCI 189. Topics in Computing. 1-3 Credits.
Selected introductory-level topics in computing for students of all majors. Course may be repeated to 6 credits with different topics. Repeatable to 6 credits. On demand.

CSCI 230. Systems Programming. 3 Credits.
Focus on low level programming. Topics covered include pointers, memory management, dynamic memory, code optimization, compiling and linking, and library development. Weekly programming assignments. Prerequisite: CSCI 161 with a grade of C or better. F,S.

CSCI 242. Algorithms and Data Structures. 3 Credits.
Object-oriented implementations of complex data structures including lists, sets, trees, and graphs. Time and space analysis and classification of algorithms using upper bounds (big Oh), lower bounds (big Omega), and exact bounds (big Theta). Techniques for analysis of recursive algorithms including use of the "Master Theorem" for divide-and-conquer recurrences. Prerequisites: CSCI 161 with a C or better and MATH 208. F,S.

CSCI 260. Advanced Programming Languages. 3 Credits.
Programming in a specific high-level language for students who are already proficient at programming in another high-level language. Course may be repeated for different languages. A student may not receive credit for both CSCI 260 and a 100-level programming course in the same language. Prerequisite: CSCI 161 or consent of instructor. Repeatable. F.

CSCI 270. Programming for Data Science. 3 Credits.
The Programming for Data Science course provides students with an introduction to the main tools and ideas in the data scientist’s toolbox. The course gives an overview of the data, questions, techniques and tools that data analysts and data scientists work with. This course provides a conceptual introduction to the ideas behind turning data into actionable knowledge and tools that will be used to analyze this data. The course will cover collecting, cleaning and sharing data. Additionally, this course will cover how to communicate results through visualizations. Prerequisite: CSCI 161 with a grade of C or better. S.

CSCI 280. Object Oriented Programming. 3 Credits.
An introduction to the concept and execution of Object-Oriented programming, using the Java language. Includes an introduction to object creations, classes, inheritance, interfaces, exceptions, overloading, and more. Prerequisite: CSCI 161 with a C or better.

CSCI 289. Social Implications of Computer Technology. 3 Credits.
An introduction to the effects of computer technology on society and individuals and to ethical problems faced by computer professionals. Topics covered include privacy, the nature of work, centralization versus decentralization and the need for human factors analysis in the development of a new computer system. F.

CSCI 290. Cyber-Security and Information Assurance. 3 Credits.
An introduction covering the breadth of essential Cyber-Security and Information Assurance topics. Students will hone skills in observation, deduction, analysis, logical reasoning and critical thinking as they gain experience with non-technical and lightly technical aspects of Cyber-Security and Information Assurance through practical and real-world examples. S.

CSCI 297. Experiential Learning. 1-3 Credits.
A practical experience in which students offer their proficiency in computing as a resource or service for others. The experience may involve software development, software consulting and assistance, system administration, or instruction. Prerequisite: CSCI 161. Repeatable to 6 credits. S/U grading. F.

CSCI 299. Topics in Computer Science. 1-3 Credits.
Selected intermediate-level topics in computer science for students with some experience or previous coursework in computing. Course may be repeated up to 6 credits with different topics. Repeatable to 6 credits. On demand.

CSCI 327. Data Communications. 3 Credits.
An introduction to the concepts of data transmission, communication hardware and protocols, communication software and the design, performance and management of computer networks. Prerequisites: CSCI 230 and MATH 208. F.

CSCI 363. User Interface Design. 3 Credits.
A study of the design and implementation of user interfaces for software applications. Students will apply principles of interface design to build applications using a toolkit of graphical interface components. Required coursework includes a team project. Prerequisite: CSCI 280 with a grade of C or better. F.
CSCI 364. Concurrent and Distributed Programming. 3 Credits.
This course focuses on concurrent object oriented programming and modern distributed/parallel programming models (such as OpenMP, CUDA, OpenCL and Actors). Students will utilize various high performance distributed computing technology. Topics covered will include shared and distributed memory systems, sockets, threads, and message passing. Prerequisites: CSCI 242 with a grade of C or better and CSCI 230 with a grade of C or better. S.

CSCI 365. Organization of Programming Languages. 3 Credits.
Compile and run time requirements of programming languages, parameter passing and value binding techniques. Vector and stack processing. Prerequisite: CSCI 242 with a grade of C or better. S.

CSCI 370. Computer Architecture. 4 Credits.
Computer structure, machine presentation of numbers and characters, instruction codes and assembly systems. Introduction to hardware methodologies and software extensions to hardware in computers. Some topics on hardware and software selection will be discussed. Prerequisites: CSCI 230 with a grade of C or better, EE 201, and EE 201L. S.

CSCI 384. Artificial Intelligence. 3 Credits.
A study of algorithms and application of AI. The topics include agent theory, problem-solving with the search, constraint satisfaction problem, game, knowledge-based system, reasoning and machine learning which are widely applicable to design of an intelligent system, data science and mining, information retrieval, pathfinding and classification, etc. Prerequisite: CSCI 242. SS, even years.

CSCI 387. Secure Software Engineering. 3 Credits.
This course provides fundamental knowledge of secure software development methodologies and applied security topics related to compiled programs. In-depth coverage of source code auditing, fuzzing, introduction to reverse engineering, and exploitation will be emphasized. F.

CSCI 388. Exploit Analysis and Development. 3 Credits.
Provides fundamental knowledge of Malware analysis. Topics include an introduction to both static and dynamic techniques for analyzing suspect binaries. Students will be exposed to advanced malware concepts including malware detection as well as the utilization of industry standard tools to analyze, debug, and reverse engineer suspect binaries. F.

CSCI 389. Computer and Network Security. 3 Credits.
This course introduces techniques for achieving security in multi-user standalone computer systems and distributed computer systems. Coverage includes host-based security topics (cryptography, intrusion detection, secure operating systems), network-based security topics (authentication and identification schemes, denial-of-service attacks, worms, firewalls), risk assessment and security policies. Prerequisite: CSCI 161. S.

CSCI 397. Cooperative Education. 1-2 Credits.
A practical work experience with an employer closely associated with the student's academic area. Arranged by mutual agreement among student, department, employer, and the UND Cooperative Education Office. Repeatable to 6 credits. Prerequisites: Declared Computer Science major with 15 completed credits in CSCI including CSCI 230 and CSCI 242. Repeatable to 6 credits. S/U grading. F.S, SS.

CSCI 399. Topics in Computer Science. 1-3 Credits.
Selected topics in Computer Science which allow students to study specialized subjects. Repeatable to 12 credits. Prerequisite: Consent of instructor. Repeatable to 12 credits. On demand.

CSCI 427. Cloud Computing. 3 Credits.
This is the undergraduate-level course on cloud computing models, techniques, and architectures. Cloud computing is an important computing model which enables information, software, and other shared resources to be provisioned over the network as services in an on-demand manner. This course introduces the current practices in cloud computing. Topics may include distributed computing models and technologies, Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS), Software-as-a-Service (SaaS), virtualization, performance and systems issues, capacity planning, disaster recovery, Cloud OS, federated clouds, challenges in implementing clouds, data centers, hypervisor CPU and memory management, and cloud hosted applications. S, even years.

CSCI 435. Formal Languages and Automata. 3 Credits.
A study of automata, grammars, and Turing machines as specifications for formal languages. Computation is defined in terms of deciding properties of formal languages, and the fundamental results of computability and decidability are derived. Prerequisites: CSCI 242 with a grade of C or better and minimum second semester junior standing. F.

CSCI 445. Mathematical Modeling and Simulation. 3 Credits.
A study of various mathematical applications for digital computers, including the modeling, simulation and interpretation of the solution of complex systems. Prerequisites: CSCI 161 or CSCI 170, and MATH 166 and a statistics course. F, even years.

CSCI 446. Computer Graphics I. 3 Credits.
Introduction to computer graphics. Topics include raster scan graphics, 2D and 3D representations, affine transformations, light and color, texture mapping, image processing, ray-tracing, and computer animation. Team-based weekly homework develops a 4 minute computer animation. Prerequisites: CSCI 242, CSCI 363, and MATH 166. F, odd years.

CSCI 448. Computer Graphics II. 3 Credits.
A continuation of CSCI 446, topics covered include: history of games, game taxonomies, game design theory, computer game development, physics engines and AI engines. Prerequisite: CSCI 446. S, even years.

CSCI 451. Operating Systems I. 3 Credits.
Introduction to operating system theory and fundamentals. Topics include: CPU scheduling, memory management, file systems, interprocess communication facilities, security. Weekly homework assignments focus on process synchronization using fork/exe, threads, mutexes, pipes, semaphores, and shared memory. Prerequisites: CSCI 242 and CSCI 370; both with a grade of C or better. F.

CSCI 452. Operating Systems II. 3 Credits.
A study of the implementation of operating systems and parts of operating systems, and development of system software. Prerequisites: CSCI 451. On demand.

CSCI 455. Database Management Systems. 3 Credits.
Database concepts, database design (ER, UML), database programming languages (SQL), NoSQL Database, Database Concurrency and recovery techniques, and Database security. Prerequisite: CSCI 242 with a grade of C or better. S, even years.

CSCI 457. Electronic Commerce Systems. 3 Credits.
A study of the system architecture, content design and implementation, and data analysis, management, and processing of electronic commerce. Topics include Internet basics, business issues, data management and processing, static and dynamic web programming, e-commerce content design and construction, and databases and host languages with embedded SQL. Prerequisite: CSCI 280 with course topic of Dot Net. S, odd years.

CSCI 463. Software Engineering. 3 Credits.
This course teaches software engineering principles and techniques used in the specification, design, implementation, verification and maintenance of large-scale software systems. Major software development methodologies are reviewed. As development team members, students participate in a group project involving the production or revision of a complex software product. Prerequisites: CSCI 242 and CSCI 363. S.

CSCI 465. Principles of Translation. 3 Credits.
Techniques for automatic translation of high-level languages to executable code. Prerequisites: CSCI 365 and CSCI 370. F, odd years.

CSCI 487. Penetration Testing. 3 Credits.
Provides theoretical and practical aspects of Network Penetration Testing. The course includes in-depth details and hands on labs for each of the five distinct phases of an ethical hack including reconnaissance, scanning and vulnerability assessment, gaining access and exploitation, maintaining access, and covering tracks. An applied approach with a focus on current tools and methodologies will be stressed. S.

CSCI 491. Seminars in Computer Science. 1 Credit.
A course for advanced students. Repeatable to 3 credits. Prerequisite: Consent of instructor. Repeatable to 3 credits. S/U grading. F.S.
EE 101. Introduction to Electrical Engineering. 1 Credit.
An introduction to the electrical engineering discipline. Recent technologies and practices in electronics, computers, controls, power systems, robotics, communication, and microwave fields. F, S.

EE 201. Introduction to Digital Electronics. 2 Credits.
Introduction to the fundamentals of digital circuits design. Logic gates; Boolean algebra; Karnaugh maps; Mathematical operations; Flip Flops; Counters. Corequisite: EE 201L. F, S.

EE 201L. Digital Electronics Laboratory. 1 Credit.
Introduction to design and implementation of digital electronic circuits. Corequisite: EE 201. F, S.

EE 206. Circuit Analysis. 3 Credits.
Introduces the foundations of electrical engineering, applying these concepts in developing the fundamentals of energy conversion, electronics and circuit theory. Prerequisite: MATH 165 with a grade of C or better; EE Major should be declared. F.

EE 206L. Circuits Laboratory I. 1 Credit.
Introduction to methods of experimental circuit analysis and to proper uses of laboratory equipment. Prerequisite: EE major should be declared. Corequisite: EE 206. F, S.

EE 304. Computer Aided Measurement and Controls. 3 Credits.
The principles of the use of a computer in a measurement and control environment are presented. Software is designed to drive interfaces to perform measurement and control algorithms. The software and concepts presented are evaluated in a laboratory environment. Prerequisites: Electrical Engineering major and MATH 165. F.

EE 313. Linear Electric Circuits. 3 Credits.
Linear electric circuits in the steady state and transient conditions; two-port circuits; Fourier Series single and polyphase systems. Prerequisites: Electrical Engineering major and EE 206 with a grade of C or better. Corequisite: EE 313L. S.

EE 313L. Circuits Laboratory II. 1 Credit.
Experimental circuit analysis and proper uses of laboratory equipment. Prerequisites: Electrical Engineering major and EE 206L. Corequisite: EE 313. S, S.

EE 314. Signals and Systems. 3 Credits.
Passive filters; Laplace transform applications; Fourier transform; Z-transform; Nyquist sampling theorem; other topics as time permits (state variables; introduction to control and communications theory; discrete Fourier transform). Prerequisite: EE 313. Corequisite: MATH 266 and EE 314L. F.

EE 314L. Signal and Systems Laboratory. 1 Credit.
In this laboratory course, students will conduct simulations and experiments related to theory covered in EE 314. The topics include implementation of passive filters, Laplace transform, and z-transform. Corequisite: EE 314. F.

EE 316. Electric and Magnetic Fields. 3 Credits.
Field produced by simple distributions of electric charges and magnetic poles, field mapping and application to engineering problems. Prerequisites: EE 206 with a grade of C or better. Corequisite: MATH 266. F.

EE 318. Engineering Data Analysis. 3 Credits.
This course will provide undergraduate electrical engineering students with an understanding of the principles of engineering data analysis using basic probability theory and basic statistics theory. Students will have the opportunity to apply these concepts to actual engineering applications and case studies. Prerequisites: EE 206 with a grade of C or better. Corequisite: EE 313. F.

EE 321. Electronics I. 3 Credits.
Fundamentals of semiconductors, nonlinear discrete components such as diodes and transistors, and integrated circuits; analysis and synthesis of simple electronic circuits, including amplifiers. Prerequisite: EE 313. Corequisite: EE 321L. F.

EE 321L. Electronics Laboratory I. 1 Credit.
Practical electronics application and design using theory studied in concurrent third year electrical engineering courses. Prerequisite: EE 313L. Corequisite: EE 321. F.

EE 397. Cooperative Education. 1-2 Credits.
A practical work experience with an employer closely associated with the student’s academic area. Arranged by mutual agreement among student, department, and employer. Repeatable to 24 credits. Prerequisite: Admission to the electrical engineering degree program; a cumulative GPA of 2.0 or higher is required. Repeatable to 24 credits. S/U grading. F, S, SS.

EE 401. Electric Drives. 3 Credits.
A study of variable speed drives and their electronic controls; analysis and synthesis of power electronics through computer simulations and laboratory implementations. Prerequisite: EE 314. Corequisite: EE 401L. S.

EE 401L. Electric Drives Laboratory. 1 Credit.
The course provides the basic knowledge required for the usage and the design of the most common electrical drives. This lab focuses on the Electric Drives and their control in a real time environment using dSPACE and/or similar digital signal processing based methods and simulations. Corequisite: EE 401. S.

EE 405. Control Systems I. 3 Credits.
Mathematical modeling and dynamic response of linear control systems; stability analysis; design of linear controllers using the root locus and frequency response techniques. Prerequisite: EE 314 and MATH 266. Corequisite: EE 405L. S.

EE 405L. Control Systems Laboratory. 1 Credit.
Experiments and simulations related to theory discussed in EE 405 are implemented in this laboratory course. The topics included mathematical modeling and dynamic response of linear systems; stability analysis; and design of controllers. Corequisite: EE 405. S.

EE 409. Distributed Networks. 3 Credits.
Fundamentals of transmission lines. Prerequisite: EE 313 and EE 316. S.

EE 411. Communications Engineering. 3 Credits.
Mathematical definition of random and deterministic signals and a study of various modulation systems. Prerequisite: EE 314. On demand.

EE 421. Electronics II. 3 Credits.
Analysis of electronic circuits and systems using discrete components and integrated circuits, digital circuits, active filters, and power amplifiers. Prerequisite: EE 314 and EE 321. Corequisite: EE 421L. S.

EE 421L. Electronics Lab II. 1 Credit.
Practical electronics application and design using theory studied in concurrent third year electrical engineering courses. Prerequisite: EE 312L. Corequisite: EE 421. S.

EE 423. Power Systems I. 3 Credits.
Electric power systems operation, control and economic analysis. Prerequisite: EE 313. On demand.

EE 424. Electronic Circuits. 3 Credits.
Principles, applications, and design of electronic equipment studied from viewpoint of complete systems. Prerequisite: EE 321. On demand.

EE 428. Robotics Fundamentals. 3 Credits.
Fundamentals of robotic systems: modeling, analysis, design, planning, and control. The project provides hands-on experience with robotic systems. Prerequisite: MATH 266 or consent of instructor. On demand.
II. College of Arts and Sciences Requirements. See College listing.

I. Essential Studies Requirements (see University ES listing).

which must be from UND) including:

Required 120 credits (36 of which must be numbered 300 or above, and 30 of

Computer Science

faculty member under whom the electrical engineering problem is studied.

Repeatable to 9 credits. F,S,SS.

Supervised independent study culminating in a thesis. Repeatable to 9 credits. EE 409 or consent of instructor. On demand.

EE 451. Computer Hardware Organization. 3 Credits.
The study of complete computer systems including digital hardware interconnection and organization and various operation and control methods necessary for realizing digital computers and analog systems. Prerequisite: EE 201 and EE 304; or consent of instructor. On demand.

EE 452. Embedded Systems. 3 Credits.
A study of microcontroller hardware and software, with an emphasis on interfacing the microcontroller with external electronic devices such as transceivers, sensors, and actuators for communications and control within an embedded system. Prerequisite: EE 201, EE 304 and EE 321. Corequisite: EE 452L. S.

EE 452L. Embedded Systems Design Laboratory. 1 Credit.
This introductory laboratory course provides students with the hands-on activities in order to learn and gain more experiences in designing embedded systems (smart systems) using microcontrollers, actuators, and sensors. Prerequisites: EE 201 and EE 304 or consent of instructor. Prerequisite or corequisite: EE 452. S.

EE 456. Digital Image Processing. 3 Credits.
Digital image retrieval, modification, enhancement, restoration, and storage. Image transformation and computer vision. The associated laboratory provides hands-on experiences. Prerequisite: EE 304 and EE 314. On demand.

EE 480. Senior Design I. 3 Credits.
First course in the two-semester capstone design experience for the electrical engineering undergraduate degree, emphasizing design methodologies, advanced communication, and teamwork. Student teams will select an electronic system to design, capture end-user requirements, and perform component trade studies, resulting in an oral and written critical design review at the end of the semester. EE 480 Senior Design I meets the Essential Studies Special Emphasis requirements for Advanced Communication (A) and Senior Capstone (C). Prerequisites: EE 309 and EE 421 and two out of the four following classes: EE 401, EE 405, EE 409, EE 452. F.

EE 481. Senior Design II. 3 Credits.
Second course in the two-semester capstone design experience for the electrical engineering undergraduate degree, emphasizing design methodologies, oral communication, and teamwork. Student teams will be required to build and test a prototype of the electronic systems designed in EE 480 Senior Design I, and they will prepare written reports and deliver oral presentations on their design choices with critique by the instructor. EE 481 Senior Design II meets the Essential Studies Special Emphasis requirement for Oral Communication (O). Prerequisite: EE 480. S.

EE 489. Senior Honors Thesis. 1-8 Credits.
Supervised independent study culminating in a thesis. Repeatable to 9 credits. Repeatable to 9 credits. F.S.SS.

EE 490. Electrical Engineering Problems. 1-9 Credits.
Repeatable to maximum of 9 credits. Prerequisite: Approval by departmental faculty member under whom the electrical engineering problem is studied. Repeatable to 9 credits. F.S.

Bachelor of Arts with Major in Computer Science

Required 120 credits (36 of which must be numbered 300 or above, and 30 of which must be from UND) including:

I. Essential Studies Requirements (see University ES listing).

II. College of Arts and Sciences Requirements. See College listing.

III. Courses from Computer Science as follows:

CSCI 160  Computer Science I *  4
CSCI 161  Computer Science II  4
CSCI 230  Systems Programming  3
CSCI 242  Algorithms and Data Structures  3
CSCI 365  Organization of Programming Languages  3
CSCI 370  Computer Architecture  4
CSCI 343  Formal Languages and Automata  3
CSCI 451  Operating Systems I  3
CSCI 465  Principles of Translation  3
CSCI 492  Senior Project I  3
CSCI 493  Senior Project II  2
CSCI 494  Special Projects in Computer Science (Co-Req CSCI 493)  1
CSCI Electives **  12

Total Credits  48

* Grade of ‘C’ or higher required.
** Electives may be selected from CSCI 260 Advanced Programming Languages (at most 3 hours), CSCI 289 Social Implications of Computer Technology, CSCI 297 Experiential Learning, CSCI 299 Topics in Computer Science or CSCI 397 Cooperative Education (at most 3 hours) and any other UND Computer Science courses numbered 300 or above.

IV. Courses from other departments as follows:

Level II proficiency in a language other than English (Level IV recommended)

ENGL 209  Introduction to Linguistics  3
EE 201  Introduction to Digital Electronics  2
EE 201L  Digital Electronics Laboratory  1
MATH 208  Discrete Mathematics  3
ECON 210  Introduction to Business and Economic Statistics  3
PHIL 110  Forward or Delete? An Introduction to Logic  3

Total Credits  15

Bachelor of Science in Data Science

Required 120 credits (36 of which must be numbered 300 or above, and 60 of which must be from a 4-year institution) including:

I. Essential Studies Requirements (see University ES listing).

II. Requirements of the College of Engineering and Mines. See College listing.

III. Courses from computer science as follows:

CSCI 130  Introduction to Scientific Programming (*)  4
CSCI 160  Computer Science I (*)  4
CSCI 161  Computer Science II (*)  4
CSCI 230  Systems Programming (*)  3
CSCI 242  Algorithms and Data Structures (*)  3
CSCI 270  Programming for Data Science  3
CSCI 280  Object Oriented Programming  3
CSCI 289  Social Implications of Computer Technology  3
CSCI 364  Concurrent and Distributed Programming (**)  3
CSCI 384  Artificial Intelligence (**)  3
CSCI 427  Cloud Computing (**)  3
CSCI 445  Mathematical Intelligence (**)  3
CSCI 492  Senior Project I (**)  3
CSCI 493  Senior Project II (**)  1
CSCI 495  Experiential Learning of Software Development (**)  2
CSCI Electives (**)  12

Total Credits  48
Bachelor of Science with a Major in Computer Science

Required 120 credits (36 of which must be numbered 300 or above, and 60 of which must be from a 4-year institution) including:

I. Essential Studies Requirements (see University ES listing).

II. Requirements of the College of Engineering and Mines. See College listing.

III. Courses from computer science as follows:

- CSCI 130: Introduction to Scientific Programming (*) 4
- or CSCI 160: Computer Science I 4
- CSCI 161: Computer Science II (*) 4
- CSCI 230: Systems Programming (*) 3
- CSCI 242: Algorithms and Data Structures (*) 3
- CSCI 280: Object Oriented Programming 3
- CSCI 289: Social Implications of Computer Technology 3
- CSCI 363: User Interface Design 3
- CSCI 365: Organization of Programming Languages (*) 3
- CSCI 370: Computer Architecture (**) 4
- CSCI 345: Formal Languages and Automata (**) 3
- CSCI 451: Operating Systems I (**) 3
- CSCI 492: Senior Project I (**) 3
- CSCI 493: Senior Project II (**) 1
- CSCI 495: Experiential Learning of Software Development (**) 2
- CSCI Electives*** 9

Total Credits 51

* Grade of ‘C’ or higher required.
** Must be taken at UND.
*** A combined total of 6 credits from CSCI 260 Advanced Programming Languages, CSCI 297 Experiential Learning, CSCI 299 Topics in Computer Science, CSCI 397 Cooperative Education or CSCI 494 Special Projects in Computer Science may be applied toward these electives. The remaining electives must be UND Computer Science courses numbered 300 or above.

IV. Courses from other departments as follows:

- COMM 110: Fundamentals of Public Speaking 3
- MATH 208: Discrete Mathematics 3
- ECON 210: Introduction to Business and Economic Statistics 3
- MGMT 301: Operations Management 3
- MGMT 309: Quantitative Methods for Managers 3

Approved probability/statistics elective 3

Approved 2-semester laboratory science sequence 8

2 approved courses in science 6-8

Total Credits 32-34

Minor in Computer Science

20 credit hours from Computer Science including:

Select one of the following:

- CSCI 160: Computer Science I 4
- CSCI 130: Introduction to Scientific Programming 4
- CSCI 161: Computer Science II 4
- CSCI Electives* 12

Total Credits 20

* Any four of CSCI 230, CSCI 242, CSCI 260, CSCI 270, CSCI 280, CSCI 289, or any CSCI 300+ level course (excluding CSCI 297, CSCI 299, CSCI 397, CSCI 399, CSCI 491, CSCI 494).

Minor in Cyber Security

Courses from Computer Science as follows (12 credits):

- CSCI 110: Introduction to Computer Science 3
- CSCI 289: Social Implications of Computer Technology 3
- CSCI 290: Cyber-Security and Information Assurance 3
- CSCI 398: Computer and Network Security 3

Courses from other departments as follows (9 credits):

- MATH 208: Discrete Mathematics 3
- ISBC 410: Information Security 3
- PSYC 499: Advanced Special Topics in Psychology 3

Total Credits 21

Optional Specializations

A student’s coursework in either the B.S. program, the B.A. program, or the Minor program above may be designed to complete one or more of the following specializations. Each specialization completed will be noted on the student’s academic record.

I. System and Programming Security

Coursework must include:

- CSCI 327: Data Communications 3
- CSCI 389: Computer and Network Security 3
- MATH 425: Cryptological Mathematics 3
- CSCI 455: Database Management Systems 3

Select two of the following:

- CSCI 384: Artificial Intelligence 3
- CSCI 427: Cloud Computing 3
- CSCI 457: Electronic Commerce Systems 3

Total Credits 18

II. Software Engineering

Coursework must include:

- CSCI 260: Advanced Programming Languages 3
- CSCI 364: Concurrent and Distributed Programming 3
- CSCI 463: Software Engineering 3

Program Specific Elective: 3
Coun 363  User Interface Design (B.A. Students)  
Coun 465  Principles of Translation (B.S. Students)  
Select one of the following: 1  
Coun 297  Experiential Learning  
Coun 397  Cooperative Education  
Coun 491  Seminars in Computer Science  
Coun 494  Special Projects in Computer Science  
Select one of the following: 3  
Coun 562  Formal Specification Methods  
Coun 565  Advanced Software Engineering  
Total Credits 16  

III. Information Technology  
Coursework must include:  
Coun 389  Computer and Network Security 3  
Coun 455  Database Management Systems 3  
Coun 457  Electronic Commerce Systems 3  
Select one of the following: 1  
Coun 297  Experiential Learning  
Coun 397  Cooperative Education  
Coun 491  Seminars in Computer Science  
Coun 494  Special Projects in Computer Science  
Select two of the following: 6  
Coun 260  Advanced Programming Languages  
Coun 327  Data Communications  
Coun 399  Topics in Computer Science  
Coun 513  Advanced Database Systems  
Total Credits 16  

A student’s coursework in the B.S. program may be designed to complete the following specialization. This specialization will be noted on the student’s academic record.  

IV. Game Development and Computer Animation  
Elective coursework must include:  
Coun 384  Artificial Intelligence 3  
Coun 463  Software Engineering 3  
Coun 446  Computer Graphics I 3  
Coun 448  Computer Graphics II 3  
ART 110  Introduction to the Visual Arts 3  
ART 112  Two & Three Dimensional Design 3  
MATH 207  Introduction to Linear Algebra 2  
PHYS 211  College Physics I 4  
PHYS 212  College Physics II 4  
Total Credits 28  

Coun 250. Dialogue on U.S. Diversity. 3 Credits.  
This seminar on diversity issues in the U.S. will cover group communication skills, psychological impact of social/cultural group identities and inequality. S.  
Coun 399. Special Topics. 1-3 Credits.  
Specially arranged seminars or courses on a variety of subjects not covered by regular departmental offerings. May be initiated by students with approval of dean and departments involved, provided appropriate instructors are available. Repeatable to 6 credits. Repeatable to 6 credits. On demand.  

Combined Program in Counseling with a Rehabilitation Emphasis  

Admission Requirements  
The deadline for a completed application to be received in the School of Graduate Studies is February 1. In addition to the admission requirements for the Counseling Master’s program, a completed application must include the following:  
1. A plan of study must be filed which demonstrates when course requirements will be taken to meet the requirements or the major or minor in Rehabilitation and Human Services and the MA in Counseling is required as part of the application process to this Combined Degree program. Individuals who are obtaining the BS degree in RHS are not required to complete RHS 997 - Internship in Rehabilitation, but are required to complete Coun 588 - Rehabilitation Counseling Internship. With this exception, all other requirements of the RHS major or minor and the Coun MA degree must be met.  
2. Part I - Essential Studies Requirements  
Part II - College of EHD Requirements  
Part III - Core Curriculum for RHS Majors (except RHS 497)  
Part IV - Extra-Departmental Requirements for RHS Majors  
Part V - One 10-credit Concentration for RHS Majors  
For RHS Minors - 15 Credits of Required Courses and 5 Credits of Listed Electives  
3. Minimum GPA of 3.0 in all undergraduate work.  
4. Written statement of interest in Rehabilitation Counseling as a profession.  

Students are granted approved admission status in the School of Graduate Studies when they have completed a total of 125 undergraduate credits with an overall GPA of 3.0 or higher. This program allows students to designate two three-credit graduate courses to count for both degrees. These courses would be Coun 514 Rehabilitation Counseling: Assessment and Evaluation and Coun 519 Career Counseling.  

The B.S. degree and the minor in Rehabilitation and Human Services, along with the M.A. degree in Counseling are granted at the same time. In the event that a student does not complete the graduate degree, the B.S. degree is granted only after the completion of 120 credits, including an approved rehabilitation internship.  

Degree Requirements  
1. Completion of an additional 24 undergraduate credits during or after the senior year.  
2. Completion of at least 60 credits of graduate course work, including:  
   Coun 502  Professional Issues in Counseling 1  
   Coun 506  Rehabilitation Counseling: Foundations and Ethical Issues 3  
   Coun 507  Life-Span Development in Counseling 3  
   Coun 510  Counseling Methods 3  
   Coun 514  Rehabilitation Counseling: Assessment and Evaluation 3  
   Coun 515  Methods of Research 3  
   Coun 518  Group Theory and Process 3  
   Coun 519  Career Counseling 3  
   Coun 520  Diagnostic and Prevention Strategies in Counseling 3  
   Coun 529  Dynamics of Addiction 3  

Counseling Psychology and Community Services (Coun)  

Combined Program in Counseling with a Rehabilitation Emphasis (p. 79)  

Courses  
Coun 101. Career Exploration. 1 Credit.  
The process of making career choices and decisions is explored through assessment, instruments, class activities, and assignments. Student interests, skills, and work values are explored and related to information about careers and job market trends. Recommended for students in the process of choosing an academic major. S/U grading. F.S.
CJ 201. Introduction to Criminal Justice. 3 Credits.
An undergraduate study and overview of the criminal justice system emphasizing the "system," its legal actors and its political constraints. Designed for the beginning student in law enforcement, criminology, corrections, sociology, social welfare, government and pre-law. F.S.

CJ 210. Introduction to Policing. 3 Credits.
Introduces the student to the specific field of law-enforcement agencies. Provides an overview of federal, state, and local law enforcement agencies. Reviews the coordination requirements of the system. Prerequisite: CJ 201. S.

CJ 220. Introduction to Courts. 3 Credits.
This course will examine the historical background, the traditions, and the legal principles that underlie the courts as an integral component of the American system of criminal justice. Both differences and similarities inherent within the State and Federal Court processes will be examined, and the procedures through which the criminal courts uphold the basic rights and liberties of all U.S. citizens, both victims and the accused, will be explored. Focus will be placed on understanding the respective roles of judges, prosecutors, defense attorneys, police officers, probation officers, and other court-related personnel in the criminal court process. Prerequisite: CJ 201. F.S.

CJ 270. Introduction to Corrections. 3 Credits.
This course describes the corrections system as part of a larger criminal justice system. Students will be introduced to the history and practice of corrections from earlier forms of physical punishment to jail, probation, intermediate sanctions, prisons, parole, and the death penalty. Special topics in the field will also be addressed as appropriate. Prerequisite: CJ 201. F.S.

CJ 302. Women, Crime, and Criminal Justice. 3 Credits.
This class will explore the changing roles of women as offenders, as victims, and as professionals in the criminal justice system. Attention will be directed toward empirical findings, conflict theory insights, and the feminist perspective within the discipline. The basic goal of this course is to respectfully enhance understanding of the importance of gender equality within the field of criminal justice and to encourage self-examination of habitual modes of thinking and acting. Prerequisite: CJ majors and minors only. S.

CJ 320. Cybersecurity Law and Investigations. 3 Credits.
Cybersecurity Law and Policy will explore the regulatory, legal, and policy framework of cybersecurity. More specifically, this course will examine laws and policies to reduce cyber threats and address cyber privacy concerns. This course will provide students with a framework for understanding state and federal laws and regulations that govern this emerging field, as well as investigative techniques and strategies for investigation and enforcement on a global scale. S.

CJ 330. Criminological Theory. 3 Credits.
This class will provide an overview of a variety of criminological theories. Attention will be directed toward the study of the major theoretical schools of thought which have influenced the discipline of criminology. The basic goal of this course is to help the student develop an understanding of and appreciation for the insights gained by examining crime and criminals through different theoretical frameworks. Prerequisite: CJ majors and minors only. F.S.

CJ 340. What Works in Policing, Sentencing, and Corrections. 3 Credits.
This course will focus on the development and identification of evidence-based practices and programs (a.k.a., EBPs) in criminal justice. A review of practices and programs in each area of the justice system will be explored including the juvenile justice system, policing, sentencing, and corrections. The course will rely heavily on systematic reviews of the empirical literature from which criminal justice practices and programs are deemed as effective, promising, or ineffective. This will include a review of work conducted by the Office of Juvenile Justice and Delinquency Prevention (OJJDP), the National Institute of Justice (NIJ), and other governmental efforts to promote empirically-justified programs. Prerequisites: CJ majors and minors only. F.

CJ 341. Criminal Law. 3 Credits.
This course covers the fundamentals and foundations of American criminal jurisprudence with an emphasis on common law definitions of crimes and modern requirements for the criminalization of behavior, statutory laws. Prerequisite: Criminal Justice Majors and Minors or Forensic Science Majors. F.

CJ 342. Criminal Procedure. 3 Credits.
This course covers requirements of the American system of criminal procedure, especially regarding the legal requirements of search and seizure, interrogation, right to counsel, and eyewitness identifications. Special attention is given to the relationship between the 4th, 5th, 6th, 8th, and 14th amendments to the U.S. Constitution and the development of the law of criminal procedure. Prerequisite: Criminal Justice Majors and Minors or Forensic Science Majors. S.

CJ 350. Correctional Alternatives. 3 Credits.
This course is designed to explore and evaluate intervention strategies developed in the criminal justice system as alternatives to institutional corrections in the sentencing of adjudicated persons. Among these options, this course looks for community corrections, parole, house arrest, restitution, community service, and the development of intervention strategies in support of the dispositions. Prerequisite: Criminal Justice majors and minors only. S.

CJ 351. Police Administration. 3 Credits.
Principles of police administration and organization for a modern police agency. Included are planning and development of organizations, direction, goal identification, etc. Prerequisites: CJ 210; CJ majors and minors only. F.

CJ 352. Criminal Investigation. 3 Credits.
An overview and examination of basic principles and techniques in the criminal investigations procedures and the rules of the law of evidence in criminal court proceedings. Prerequisites: CJ 210, CJ majors and minors, and forensic science majors. F.

CJ 351. Victimology. 3 Credits.
This class will provide an overview of the literature and research concerning victimization. Attention will be directed toward current trends concerning the victim in the American criminal justice system, with particular emphasis on measuring victimization, fear of crime, the impact of victimization on the individual, and victims rights and compensation initiatives. The basic goal of this course is to help the student develop an understanding of the impact of victimization on the victim, those associated with the victim, the criminal justice system, and each of us as individuals. Prerequisite: Criminal Justice majors and minors only. F.

CJ 365. Law and Society. 3 Credits.
This course explores legal ideals, deviations from those ideals, and the relationship between culture, social structure, and law. Prerequisite: CJ majors and minors only. F.S.

CJ 397. Cooperative Education. 1-6 Credits.
A practical work experience with an employer closely associated with the major or minor in Criminal Justice Studies. The student is required to have a criminal background check performed with results deemed favorable by the field agency as a condition of their initial enrollment and/or continued enrollment in the cooperative education program. Repeatable to 12 credits. Prerequisite: CJ 494; CJ majors and minors only. Repeatable to 12 credits. S/U grading. F.S.SS.

CJ 399. Problems in Criminal Justice. 1-3 Credits.
Students study special topics under the direction and supervision of a member of the faculty; prior consent of instructor is required before enrollment. Repeatable to 12 credits in different topic areas. Prerequisites: Criminal Justice majors and minors only and consent of instructor. Repeatable to 12 credits. On demand.
II. The Following Curriculum (42 credits):

I. Essential Studies Requirements (see University ES listing).

II. The Following Curriculum (42 credits):

Select three of the following:

- ANTH 346
- CJ 302 Women, Crime, and Criminal Justice
- CJ 320 Cybersecurity Law and Investigations
- CJ 350 Correctional Alternatives
- CJ 351 Police Administration
- CJ 352 Criminal Investigation
- CJ 361 Victimology
- CJ 430 Developmental Perspectives on Adolescent Problem Behavior
- CJ 440
- CJ 452 The Police Role in Society
- SOC 252 Criminology
- SOC 253 Delinquency and Juvenile Justice

Total Credits 42

A concentration in a single supplementary field other than criminal justice studies is also required of all criminal justice majors. This concentration may be met in one of three ways:

1. A language proficiency of level IV in a modern foreign language;
2. Completion of the four-course sequence in American Sign Language; or
3. 20 credit hours (at least nine of which must be numbered 300 or above) in any single subject matter taught at this University.

Minor in Criminal Justice Studies

21 credits required:

- CJ 201 Introduction to Criminal Justice 3
- CJ 210 Introduction to Policing 3
- CJ 220 Introduction to Courts 3
- CJ 270 Introduction to Corrections 3

Select three of the following: 9

- FS 345 Forensic Science
- FS 346 Analysis of Forensic Evidence
- CJ 302 Women, Crime, and Criminal Justice
- CJ 320 Cybersecurity Law and Investigations
- CJ 330 Criminological Theory
- CJ 340 What Works in Policing, Sentencing, and Corrections
- CJ 341 Criminal Law
- CJ 342 Criminal Procedure
- CJ 350 Correctional Alternatives
- CJ 351 Police Administration
- CJ 352 Criminal Investigation
- CJ 361 Victimology
- CJ 365 Law and Society
- CJ 399 Problems in Criminal Justice
- CJ 430 Developmental Perspectives on Adolescent Problem Behavior
- CJ 452 The Police Role in Society
- PHIL 371 Philosophy of Law
- SOC 252 Criminology
- SOC 253 Delinquency and Juvenile Justice

Total Credits 21

Bachelor of Science in Criminal Justice Studies

Required 120 credits (36 of which must be numbered 300 or above, and 30 of which must be from UND) including:

I. Essential Studies Requirements (see University ES listing).

II. The Following Curriculum (42 credits):

Preadmission Requirements

- CJ 201 Introduction to Criminal Justice 3
- CJ 210 Introduction to Policing 3
- CJ 220 Introduction to Courts 3
- CJ 270 Introduction to Corrections 3

Required upper division courses

- CJ 330 Criminological Theory 3
- CJ 341 Criminal Law 3
- CJ 342 Criminal Procedure 3
- CJ 365 Law and Society 3
- CJ 401 Administration of Criminal Justice Systems 3
- SOC 323 Sociological Research Methods 3
- SOC 326 Sociological Statistics 3

Select three of the following: 9

- ANTH 345

Earth System Science and Policy (ESSP)

Minor in Sustainability Studies (p. 82)
Courses

ESSP 160. Sustainability & Society. 3 Credits.
Human interactions with the natural environment are often perceived as conflicts between environmental protection and socio-economics. Sustainability attempts to redefine that world view by seeking balance between the 'three E's': environment, economy, equity. This course examines the concept of sustainability, the theory behind it, and what it means for society. F.

ESSP 200. Sustainability Science. 3 Credits.
This course will provide an integrated, system-oriented introduction on the concepts, theories and issues surrounding a sustainable future for humans and the Planet Earth. The course will address the concept of sustainability, the concept of a system, explore human world views, provide an introduction to energy, complexity and ecosystems, and examine resources use, food production, industrial development and the prospects for a sustainable future. S.

ESSP 310. Sustainable Food Systems. 3 Credits.
This course will examine the need for development of sustainable food production systems. The course will introduce the concept of an integrated agro-ecosystem. Students will learn how food production systems work, how they impact natural ecosystems, how fragile the human food resource has become, and gain an appreciation of the complexity of relationships between humans and food. F, odd years.

ESSP 320. Land and Water Sustainability. 3 Credits.
This course covers topics of sustainability of physical landscapes and water on the Earth. Class lectures will introduce concepts related to landscape use, perception of landscape and water use as a resource, and most importantly, how to use the physical landscape and freshwater as a resource in a manner to which it will be viable for future generations (i.e. landscape and water resource sustainability). Topics include, but are not limited to snow and glacier melt water, ground water, mountain environment resources, river flood plain land use, and water use in desert environments. F, odd years.

ESSP 330. Environmental Change: Adaptation & Mitigation. 3 Credits.
The objective is to introduce the varieties of adaptation and mitigation strategies to address four main sustainability challenges: land use/land cover change, climate change, water security, and biodiversity loss. The major physical processes of the Earth systems will be examined, together with the natural and anthropogenic changes in these processes; then, the societal impacts from modifications to the Earth systems will be described; finally, the strategies of adaptation and mitigation will be compared, using a variety of regional case studies as examples. S, odd years.

ESSP 333. Oceanography. 3 Credits.
Oceanography introduces the ocean and the study of the ocean, which regulates our climate, maintains our atmosphere, and serves as an enormous resource. The course explores all aspects of the oceans- their physics, chemistry and biology, as well as the structure of the basins that contain them. Students will learn how the oceans interact with the atmosphere and the solid Earth, understand the role played by the oceans, not only as a producer of food and source of recreation, but as a transporter of heat energy, sink for greenhouse gases, and moderator of the climate. In the end, students will come away with a deeper understanding of how the ocean works and greater appreciation for the benefits we derive from it. F, odd years.

ESSP 420. Sustainable Energy. 3 Credits.
This course is an interdisciplinary exploration of Sustainable Energy. The interdisciplinary exploration includes the analysis of renewable energy systems as well as the socio-economical, political, and environmental aspects of renewable energy. The course will specifically analyze the origin and dimensions of global energy issues and identify how renewable energy issues and policies are critical to the sustainable future of global environmental quality, economic growth, social justice, and democracy. S, even years.

ESSP 450. Environmental and Natural Resource Economics. 3 Credits.
This course will cover the general topics in the field of environmental and natural resource economics: market failure, pollution regulation, the valuation of environmental amenities, renewable and non-renewable resources management, and the economics of biodiversity conservation, climate change and sustainability. The course has a strong focus on the interaction between human society and natural environmental systems and the connection between market equilibrium and social sustainability. F, odd years.

ESSP 460. Global Environmental Policy. 3 Credits.
Governance and policy are the most common strategies used to address environmental problems. This course introduces students to the foundation, development, actors, process, challenges, and future outlook of global environmental policy. By navigating various levels of US and global governance, students will explore a variety of concepts and principles in the development and implementation of environmental policies. S, odd years.

ESSP 499. Special Topics in Sustainability. 1-4 Credits.
Investigation and detailed study of special topics related to sustainability issues. The course may include a lab if applicable. Repeatable once with different topic. Maximum of 8 credits. Repeatable to 8 credits. On demand.

Minor in Sustainability Studies

Required 21 credits including:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ESSP 160</td>
<td>Sustainability &amp; Society</td>
<td>3</td>
</tr>
<tr>
<td>ESSP 200</td>
<td>Sustainability Science</td>
<td>3</td>
</tr>
<tr>
<td>Two electives</td>
<td>from the following proposed ESSP courses</td>
<td>6</td>
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<tr>
<td>ESSP 330</td>
<td>Environmental Change: Adaptation &amp; Mitigation</td>
<td>3</td>
</tr>
<tr>
<td>ESSP 310</td>
<td>Sustainable Food Systems</td>
<td></td>
</tr>
<tr>
<td>ESSP 320</td>
<td>Land and Water Sustainability</td>
<td></td>
</tr>
<tr>
<td>ESSP 333</td>
<td>Oceanography</td>
<td></td>
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<tr>
<td>ESSP 420</td>
<td>Sustainable Energy</td>
<td></td>
</tr>
<tr>
<td>ESSP 450</td>
<td>Environmental and Natural Resource Economics</td>
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<tr>
<td>ESSP 460</td>
<td>Global Environmental Policy</td>
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<tr>
<td>ESSP 499</td>
<td>Special Topics in Sustainability</td>
<td></td>
</tr>
<tr>
<td>ESSP 570</td>
<td>Communicating Environmental Information</td>
<td></td>
</tr>
</tbody>
</table>

Three additional electives 1         9-10

Total Credits                        21-22

1   These may be fulfilled with ESSP courses or options from an approved list of courses in other UND departments; only two courses can be applied from the same department outside ESSP. The electives will be approved based on their topical contributions to the fundamentals of the sustainability pillars: environment, society and/or economy. The approved list may be subject to change each academic year. Additional or alternative course electives may be approved by the Coordinator of the ESSP Minor in Sustainability Studies on a semester by semester basis or upon student request.

Economics (Econ)

B.B.A. with Major in Business Economics (p. 85)
B.B.A with Major in Banking and Financial Economics (p. 85)
B.A. in Economics (p. 84)
Minor in Economics (p. 86)
Certificate in Applied Economics (p. 86)

Courses

ECON 105. Elements of Economics. 3 Credits.
Survey of Economic principles for students planning no further formal study of Economics. Analysis of factors influencing aggregate levels of output, employment, and prices; introduction to U.S. monetary system; price determination and resource allocation under competitive and monopolistic conditions. Review of selected contemporary economic issues. (No credit if Economics 201-202, Principles of Microeconomics and Macroeconomics, have been completed or audited. Not available to students in the College of Business and Public Administration.). Prerequisite: Not available to students in the College of Business and Public Administration. F.S.
ECON 201. Principles of Microeconomics. 3 Credits.
Nature, method, and scope of Economic analysis; economic scarcity, resources, specialization and division of labor, supply and demand, production and cost, technology, product and resource market structures, distribution of income, and international trade. Prerequisite or Corequisite: MATH 103 or MATH 146 or MATH 165 or MATH 166. F.S.

ECON 202. Principles of Macroeconomics. 3 Credits.
Nature, method, and scope of economic analysis; aggregate levels of income and employment, inflation, monetary and fiscal policy, the role of the U.S. economy as part of a world economic system. Prerequisite: ECON 201. F.S.

ECON 206. Survey of Economic Principles: Micro-Macro. 4 Credits.
Accelerated course in economic principles intended for students pursuing the MBA graduate degree. This course considers both micro and macro topics. Micro topics include: Economics and Economic Reasoning; The Economic Organization of Society; Supply-Demand Analysis; Elasticity; Individual Choice; Production and Cost Analysis; and Market Structures. Macro topics include: National Income Accounting; Economic Growth, Business Cycles and Inflation; Fiscal Policy; Monetary Economics; Monetary Policy; and the World Economy. Prerequisite: Consent of instructor. On demand.

ECON 210. Introduction to Business and Economic Statistics. 3 Credits.
Descriptive statistics; probability distributions; sampling distributions; statistical inference for means and proportions; hypothesis testing; simple regression and correlation; non-parametric statistics. Prerequisite: MATH 103 or MATH 146 or MATH 165 or MATH 166. F.S.

ECON 216. Mathematics and Statistics for MBA Students. 3 Credits.
To provide knowledge in mathematics and statistics needed for students in the MBA program. Topics include, among others, linear and quadratic functions, logarithmic and exponential functions, matrix algebra, limits, derivatives, linear and nonlinear programming, descriptive statistics, data collection, sampling, probability, estimation, hypothesis testing, statistical inference, and linear regression. Prerequisite: Approval of MBA director. SS.

ECON 303. Money and Banking. 3 Credits.
Nature of our current Monetary system; functional analysis of commercial bank operations; limits to credit expansion; alternative theories of the value of money; monetary and fiscal policies for control of the business cycle; powers of the Federal Reserve System and the Treasury; mechanics of international payment; balance-of-payments and other problems. Prerequisites: ECON 201 and ECON 202. F.S.

ECON 305. Principles of Banking I. 3 Credits.
This course introduces the students to basic principles of banking governing loans, investments, deposits, liabilities, and capital. Consideration is given to the areas of liquidity, profitability, and capital adequacy as they relate to regulatory standards. Additional topics include bank organization, performance, and scope of services. Prerequisite: ECON 303. F.

ECON 306. Principles of Banking II. 3 Credits.
A continuation of ECON 305, Principles of Banking I. Students will explore the application of theory to the financial decision making and management of banks. The main focus of the course is the assessment of bank risks and management of those risks. A feature of the course is the use of a bank simulation model to connect theory and practice. Prerequisite: ECON 305. S.

ECON 308. Intermediate Microeconomic Theory. 3 Credits.
Theory of demand, production, and cost; price determination under alternative market structures; general equilibrium and economic welfare; analysis of market failure; applications to public policy. (Core requirement for students planning advanced study in Economics.). Prerequisites: ECON 201 and ECON 202. F.

ECON 309. Intermediate Macroeconomic Theory and Policy. 3 Credits.
A framework for studying national income, employment, and the general price level is developed. Theoretical perspectives on the National Income and Product accounts, expenditures in the public and private sectors of the economy, and supply and demand for money, labor and other resources are surveyed. Macroeconomic Theory is then applied to a study of monetary, fiscal, incomes, and other policies intended to influence unemployment, inflation, balance of international financial payments, and economic growth. (Core requirement for students planning advanced study in Economics.). Prerequisites: ECON 201 and ECON 202. S.

ECON 324. Public Finance. 3 Credits.
Growth and effects of the public sector of the economy emphasizing effects of taxation and spending or borrowing and debt management on efficiency and use of economic resources. Prerequisites: ECON 201 and ECON 202.

ECON 330. Business and Economic History. 3 Credits.
An analysis of the growth and development of the American economy since its colonial origins. The framework of economic analysis applied to the patterns and trends. Specific topics include industrialization, capital accumulations, financial innovation, technological change, banking, the Great Depression and effects of entrepreneurial and government decisions. Prerequisites: ECON 105 or ECON 201 or ECON 202. F.

ECON 338. International Economics. 3 Credits.
Economic basis for gain in international trade; capital and population movements; international disequilibrium and the process of balance-of-payments adjustments; tariffs, underdeveloped countries. Prerequisites: ECON 201 and ECON 202. F.S.

ECON 341. Labor Economics and Labor Relations. 3 Credits.
A survey of the nature and causes of the economic problems of the American wage and salary earner and of the attempts of wage earners and society, through organizations and legislation, to alleviate these problems. The course comparatively surveys the history and systematic theories of labor movements and the market and institutional influences on wages and employment. Particular emphasis will be placed on the law of industrial relations, employment and income access, and the adjustment of labor disputes. Prerequisites: ECON 201 and ECON 202. F.

ECON 355. Government Regulation of Business. 3 Credits.
An exploration of the many ways that federal and state governments regulate business activity. Government regulation falls into three broad areas: economic regulation; social regulation; antitrust laws. The historical development of regulation, from both a legal and economic perspective, will be discussed. Particular attention will be paid to the current trend toward deregulation of previously regulated industries such as airlines, telecommunications, and trucking. Prerequisites: ECON 201 and ECON 202. F.

ECON 380. Global Economic Development. 3 Credits.
This course focuses on economic development issues at the global level. It covers both developing countries in the conventional sense and economies in transition from socialism to a market economy. In this context development is broadly defined as the transition from one stage of development to another. Selected topics common among these countries (such as determinants of growth, modernization, technology, price liberalization, privatization, macro stabilization, trade policies, legal structure, organized crime, inequality, poverty, human capital, and global sustainability) are discussed to better understand the forces that shape the wealth and well being of nations and people in the world around us. Prerequisites: ECON 201 and ECON 202. On demand.

ECON 395. Special Topics in Economics. 1-3 Credits.
Specific topic will vary from year to year; some years an important development in economic theory, other years, a significant issue in economic policy. Repeatable to 20 credits. Prerequisites: ECON 201 and ECON 202. Repeatable to 20 credits. On demand.

ECON 397. Cooperative Education. 1-2 Credits.
A practical work experience with an employer closely associated with the student's academic area. Repeatable to 6 credits. Prerequisite: Permission of departmental Cooperative Education Coordinator. Repeatable to 3 credits. S/U grading. F,S,SS.

ECON 400. History of Economic Thought. 3 Credits.
Broad overview of the major schools of thought including Mercantilist, Physiocrat, Classical, Marxist, Socialist, Historical, Austrian, Neoclassical, Institutional, Keynesian, and Monetarist. The coverage includes value theory, income/expenditure theory, growth/development theory, scientific method, scope and public policy. Prerequisites: ECON 105 or ECON 201, and ECON 202. S.

ECON 405. Bank Regulation. 3 Credits.
The regulations imposed upon the banking industry are examined at several levels: state, federal, and global. Both the historical development of banking regulation as well as current issues/controversies are discussed. In addition, the banker's perspective of regulatory compliance is explored. Prerequisite: ECON 303. S.
Bachelor of Economics

The major in Economics provides a critical examination of how the economic system works in the United States and throughout the world. The introductory courses are surveys of economic problems, policies, and theory; the required courses in micro theory and macro theory give a deeper analytical foundation.

ECON 409. Current Issues in Macroeconomic Policy. 3 Credits.
This course focuses on the conduct of macroeconomic policy, especially as it pertains to the operations and functions of the nation's financial system. The two basic tools of macroeconomic policy - monetary policy and fiscal policy - are studied from historical, contemporary, and theoretical perspectives. Emphasis is placed on recent developments in the theory and practice of macroeconomic policy; special emphasis is placed on the role of monetary policy as it affects the operations of financial markets and financial institutions. Prerequisite: ECON 303. S.

ECON 410. Empirical Methods in Economics I. 3 Credits.
This course is an introduction to econometrics, the joint area of economics and statistics dealing with the application of statistics to economic problems. The course objectives are to acquire a basic understanding of the theory and methods of econometrics and to gain practical experience in utilizing these methods. The students will use the tools developed in the course in homework and written assignments so that they can develop an insight to theory and its application. Prerequisites: ECON 201, ECON 202 and ECON 210. F.

ECON 411. Economic Forecasting. 3 Credits.
An introduction to Economics Forecasting and Time Series Analysis. The course will cover specifications and estimation of ARMA models, seasonality, non-stationarity, unit roots and forecast evaluations. Empirical applications are used throughout the course. Prerequisite or Corequisite: ECON 410 or ECON 506. S.

ECON 414. Managerial Economics. 3 Credits.
A synthesis relating economic theory, statistics, and mathematics to pricing, output, and resource allocation decisions by business firms. Prerequisites: ECON 210 and ECON 308; MATH 146 or equivalent; ISBC 117 or equivalent. S.

ECON 416. Mathematics for Economists. 3 Credits.
Study of mathematical methods in the areas of introductory calculus and linear algebra, and their application to economic analysis. Mathematical analysis of static and dynamic equilibrium models, growth models, distribution, production functions, cycles, activity analysis, mathematical programming, and model building. Prerequisite: MATH 146 or MATH 165. Prerequisite or Corequisites: ECON 308. F.

ECON 420. Economic Education. 3 Credits.
Designed for students planning to teach secondary social studies. Curriculum materials and methods of teaching economics; techniques for integrating economics into social studies curriculum. Prerequisites: ECON 105 or equivalent. On demand.

ECON 438. International Money and Finance. 3 Credits.
Identification of key international financial concepts and analysis of their relationships in the international money and capital markets; determination of the balance of payments and exchange rates; and examination of alternative organizations of the international monetary system. Prerequisite: ECON 303. F.

ECON 489. Senior Honors Thesis. 1-8 Credits.
Supervised independent study culminating in a thesis. Repeatable to 9 credits. Repeatable to 9 credits. F.S.S.S.

ECON 495. Readings in Economics. 1-3 Credits.
Extensive reading in the student's field of specialization; conference arranged with the instructor; written reports to be submitted. Repeatable to 3 credits. F.S.S.S.

ECON 496. Research in Economics. 1-3 Credits.
Research work and use of original documents; collecting of material and preparing of special topics and bibliographies; familiarizing the student with government publications and other material available for study of economic problems. F.S.S.S.

ECON 497. Internship. 1-4 Credits.
An internship is designed to provide the student with an opportunity for participating in a supervised work experience directly related to the field of training. Student will work closely with faculty adviser in planning the internship with an approved cooperating institution. Prerequisite: Permission of Department Committee on Internships. S/U grading. F.S.S.S.

Electives permit further study in a wide range of fields, including international trade and finance, public sector economics, economic development, economic history, capital theory and finance, labor economics, income distribution, political economy, financial markets, and public policy analysis. The major in Economics provides a general background that is useful to those planning careers in law, government service, or business, as well as those planning careers as professional economists. Professional economists work as college professors, as researchers for government agencies, in businesses and consulting firms, and as administrators and managers in a wide range of fields.

Required 120 credits (36 of which must be numbered 300 or above, and 30 of which must be from UND) including:

I. Essential Studies Requirements (see University ES listing: 39 credit hours)

II. Required Major Courses (24 credit hours):

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 201</td>
<td>Principles of Microeconomics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 202</td>
<td>Principles of Macroeconomics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 210</td>
<td>Introduction to Business and Economic Statistics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 303</td>
<td>Money and Banking</td>
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<td>ECON 309</td>
<td>Intermediate Macroeconomic Theory and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ECON 338</td>
<td>International Economics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 410</td>
<td>Empirical Methods in Economics I</td>
<td>3</td>
</tr>
<tr>
<td>ECON 497</td>
<td>Internship</td>
<td>1-4</td>
</tr>
</tbody>
</table>

Total Credits: 24

* This course satisfies part of the ES Social Sciences requirement and carries a Q designation.
** This course satisfies part of the ES Math, Science, and Technology requirement and carries a Q designation.

III. Elective Major Courses: Choose from either Option A, Option B, or a 12 credit hour combination from Options A and B below.

Option A - Choose at least 12 credit hours from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 305</td>
<td>Principles of Banking I</td>
<td>3</td>
</tr>
<tr>
<td>ECON 324</td>
<td>Public Finance</td>
<td>3</td>
</tr>
<tr>
<td>ECON 330</td>
<td>Business and Economic History</td>
<td>3</td>
</tr>
<tr>
<td>ECON 341</td>
<td>Labor Economics and Labor Relations</td>
<td>3</td>
</tr>
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<td>ECON 355</td>
<td>Government Regulation of Business</td>
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<tr>
<td>ECON 380</td>
<td>Global Economic Development</td>
<td>3</td>
</tr>
<tr>
<td>ECON 395</td>
<td>Special Topics in Economics</td>
<td>1-3</td>
</tr>
<tr>
<td>ECON 397</td>
<td>Cooperative Education</td>
<td>1-4</td>
</tr>
<tr>
<td>ECON 400</td>
<td>History of Economic Thought</td>
<td>3</td>
</tr>
<tr>
<td>ECON 405</td>
<td>Bank Regulation</td>
<td>3</td>
</tr>
<tr>
<td>ECON 409</td>
<td>Current Issues in Macroeconomic Policy</td>
<td>3</td>
</tr>
<tr>
<td>ECON 411</td>
<td>Economic Forecasting</td>
<td>3</td>
</tr>
<tr>
<td>ECON 414</td>
<td>Managerial Economics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 416</td>
<td>Mathematics for Economists</td>
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</tr>
<tr>
<td>ECON 438</td>
<td>International Money and Finance</td>
<td>3</td>
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<tr>
<td>ECON 489</td>
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<td>ECON 495</td>
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<tr>
<td>ECON 497</td>
<td>Internship</td>
<td>1-4</td>
</tr>
<tr>
<td>ECON 575</td>
<td>Advanced Special Topics</td>
<td>3</td>
</tr>
</tbody>
</table>

* No more than 6 credit hours of electives from ECON 397 Cooperative Education, ECON 495 Readings in Economics, ECON 496 Research in Economics, and ECON 497 Internship may count toward the elective major courses.

Option B (Quantitative Option*) - Choose 12 credit hours from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 411</td>
<td>Economic Forecasting</td>
<td>3</td>
</tr>
<tr>
<td>ECON 416</td>
<td>Mathematics for Economists</td>
<td>3</td>
</tr>
<tr>
<td>MATH 165</td>
<td>Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 166</td>
<td>Calculus II</td>
<td>4</td>
</tr>
</tbody>
</table>

TOTAL CREDITS: 12
Bachelor of Business Administration with Major in Banking and Financial Economics

The Economics Faculty together with other faculty in the College of Business and Public Administration offer a major in Banking and Financial Economics that is intended to prepare students for employment with financial institutions and government. The major is comprised of a comprehensive curriculum that provides a background in basic business, economic theory, the principles and practices of banks and other financial institutions, bank regulation, macroeconomic policy and international finance. Experience has shown the graduates of this program are prepared to immediately function in highly responsible positions in financial institutions and regulatory agencies.

All B.B.A. candidates must fulfill the College of Business and Public Administration degree requirements.

Required 120 credit hours (36 of which must be numbered 300 or above) including:

I. Essential Studies Requirements (see University ES listing).

II. Choose one of the following: MATH 103, MATH 146, or MATH 165

III. College of Business and Public Administration Requirements:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 200</td>
<td>Elements of Accounting I</td>
<td>3</td>
</tr>
<tr>
<td>ACCT 201</td>
<td>Elements of Accounting II</td>
<td>3</td>
</tr>
<tr>
<td>ECON 201</td>
<td>Principles of Microeconomics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 202</td>
<td>Principles of Macroeconomics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 210</td>
<td>Introduction to Business and Economic Statistics</td>
<td>3</td>
</tr>
<tr>
<td>ISBC 217</td>
<td>Fundamentals of Computer Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>FIN 310</td>
<td>Principles of Financial Management</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 300</td>
<td>Principles of Management</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 301</td>
<td>Operations Management</td>
<td>3</td>
</tr>
<tr>
<td>MRKT 305</td>
<td>Marketing Foundations</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 475</td>
<td>Strategic Management</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits: 33

IV. Major Requirements:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 303</td>
<td>Money and Banking</td>
<td>3</td>
</tr>
<tr>
<td>ECON 305</td>
<td>Principles of Banking I</td>
<td>3</td>
</tr>
<tr>
<td>ECON 306</td>
<td>Principles of Banking II</td>
<td>3</td>
</tr>
<tr>
<td>ECON 308</td>
<td>Intermediate Microeconomic Theory</td>
<td>3</td>
</tr>
<tr>
<td>ECON 309</td>
<td>Intermediate Macroeconomic Theory and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ECON 405</td>
<td>Bank Regulation</td>
<td>3</td>
</tr>
<tr>
<td>ECON 438</td>
<td>International Money and Finance</td>
<td>3</td>
</tr>
<tr>
<td>FIN 340</td>
<td>Intermediate Financial Management</td>
<td>3</td>
</tr>
<tr>
<td>FIN 360</td>
<td>Capital Market Financing and Investment Strategies</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits: 27

* ACCT 218 Advanced Spreadsheet Applications is waived as a prerequisite for Banking and Financial Economics majors.

V. Elective Major Courses: Choose at least 9 credit hours from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 301</td>
<td>Intermediate Accounting I</td>
<td>3</td>
</tr>
<tr>
<td>ACCT 302</td>
<td>Intermediate Accounting II</td>
<td>3</td>
</tr>
<tr>
<td>ECON 395</td>
<td>Special Topics in Economics</td>
<td>1-3</td>
</tr>
<tr>
<td>ECON 397</td>
<td>Cooperative Education</td>
<td>1-2</td>
</tr>
<tr>
<td>ECON 410</td>
<td>Empirical Methods in Economics I</td>
<td>3</td>
</tr>
<tr>
<td>ECON 411</td>
<td>Economic Forecasting</td>
<td>3</td>
</tr>
<tr>
<td>ECON 414</td>
<td>Managerial Economics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 416</td>
<td>Mathematics for Economists</td>
<td>3</td>
</tr>
<tr>
<td>ECON 497</td>
<td>Internship</td>
<td>1-4</td>
</tr>
<tr>
<td>FIN 321</td>
<td>Real Estate Finance and Investment</td>
<td>3</td>
</tr>
<tr>
<td>FIN 324</td>
<td>Real Estate Appraisal</td>
<td>3</td>
</tr>
<tr>
<td>FIN 350</td>
<td>Financial Statement Analysis</td>
<td>3</td>
</tr>
<tr>
<td>FIN 420</td>
<td>Investment Analysis and Portfolio Management</td>
<td>3</td>
</tr>
<tr>
<td>FIN 450</td>
<td>Financial Derivatives</td>
<td>3</td>
</tr>
<tr>
<td>FIN 491</td>
<td>Senior Topics in Finance</td>
<td>3</td>
</tr>
</tbody>
</table>

VI. College of Business & Public Administration Graduation Requirements:

1. Earn a minimum cumulative GPA of 2.50
2. Earn a minimum UND GPA of 2.50
3. Earn a minimum cumulative major GPA of 2.50 (business administration courses that apply toward the degree and major)
4. Earn a minimum UND major GPA of 2.50 (business administration courses that apply toward the degree and major)
5. At least half of the business courses that apply toward the degree and major must be from UND

Bachelor of Business Administration with Major in Business Economics

The major in Business Economics is offered through the College of Business and Public Administration. This program emphasizes the business firm — integrating economics with related areas in marketing, management, accounting, finance, and quantitative analysis. Students who complete a major in Business Economics possess a comprehensive background in the basic foundations of a business as well as the analytical skills in economics increasingly required to be successful in the business world at local, regional, national and international levels. All B.B.A. candidates must fulfill the College of Business and Public Administration degree requirements.

Required 120 credit hours (36 of which must be numbered 300 or above) including:

I. Essential Studies Requirements (see University ES listing).

II. Choose one of the following: MATH 103, MATH 146, or MATH 165

III. College of Business and Public Administration Requirements:

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<tr>
<td>ACCT 201</td>
<td>Elements of Accounting II</td>
<td>3</td>
</tr>
<tr>
<td>ECON 201</td>
<td>Principles of Microeconomics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 202</td>
<td>Principles of Macroeconomics</td>
<td>3</td>
</tr>
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<td>ECON 210</td>
<td>Introduction to Business and Economic Statistics</td>
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<td>Fundamentals of Computer Information Systems</td>
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<td>FIN 310</td>
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<td>MGMT 300</td>
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<td>MRKT 305</td>
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</tr>
<tr>
<td>MGMT 475</td>
<td>Strategic Management</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits: 27

* ACCT 218 Advanced Spreadsheet Applications is waived as a prerequisite for Banking and Financial Economics majors.

V. Elective Major Courses: Choose at least 9 credit hours from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 301</td>
<td>Intermediate Accounting I</td>
<td>3</td>
</tr>
<tr>
<td>ACCT 302</td>
<td>Intermediate Accounting II</td>
<td>3</td>
</tr>
<tr>
<td>ECON 395</td>
<td>Special Topics in Economics</td>
<td>1-3</td>
</tr>
<tr>
<td>ECON 397</td>
<td>Cooperative Education</td>
<td>1-2</td>
</tr>
</tbody>
</table>

Total Credits: 33
IV. Major Requirements:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 303</td>
<td>Money and Banking</td>
<td>3</td>
</tr>
<tr>
<td>ECON 308</td>
<td>Intermediate Microeconomic Theory</td>
<td>3</td>
</tr>
<tr>
<td>ECON 309</td>
<td>Intermediate Macroeconomic Theory and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ECON 338</td>
<td>International Economics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 410</td>
<td>Empirical Methods in Economics I</td>
<td>3</td>
</tr>
<tr>
<td>ECON 414</td>
<td>Managerial Economics</td>
<td>3</td>
</tr>
<tr>
<td>Total Credits</td>
<td></td>
<td>18</td>
</tr>
</tbody>
</table>

V. Elective Major Courses: Choose from either Option A, Option B, or a 9 credit hour combination from Options A and B below.

Option A - Choose at least 9 credit hours from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 305</td>
<td>Principles of Banking I</td>
</tr>
<tr>
<td>ECON 324</td>
<td>Public Finance</td>
</tr>
<tr>
<td>ECON 330</td>
<td>Business and Economic History</td>
</tr>
<tr>
<td>ECON 341</td>
<td>Labor Economics and Labor Relations</td>
</tr>
<tr>
<td>ECON 355</td>
<td>Government Regulation of Business</td>
</tr>
<tr>
<td>ECON 380</td>
<td>Global Economic Development</td>
</tr>
<tr>
<td>ECON 395</td>
<td>Special Topics in Economics</td>
</tr>
<tr>
<td>ECON 397</td>
<td>Cooperative Education*</td>
</tr>
<tr>
<td>ECON 400</td>
<td>History of Economic Thought</td>
</tr>
<tr>
<td>ECON 405</td>
<td>Bank Regulation</td>
</tr>
<tr>
<td>ECON 409</td>
<td>Current Issues in Macroeconomic Policy</td>
</tr>
<tr>
<td>ECON 411</td>
<td>Economic Forecasting</td>
</tr>
<tr>
<td>ECON 416</td>
<td>Mathematics for Economists</td>
</tr>
<tr>
<td>ECON 438</td>
<td>International Money and Finance</td>
</tr>
<tr>
<td>ECON 489</td>
<td>Senior Honors Thesis</td>
</tr>
<tr>
<td>ECON 495</td>
<td>Readings in Economics ^</td>
</tr>
<tr>
<td>ECON 496</td>
<td>Research in Economics</td>
</tr>
<tr>
<td>ECON 497</td>
<td>Internship</td>
</tr>
<tr>
<td>ECON 575</td>
<td>Advanced Special Topics</td>
</tr>
</tbody>
</table>

* No more than 6 credit hours of electives from ECON 397 Cooperative Education, ECON 495 Readings in Economics, ECON 496 Research in Economics, and ECON 497 Internship may count toward the elective major courses.

Option B (Quantitative Option)* - Choose 9 credit hours from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 411</td>
<td>Economic Forecasting</td>
</tr>
<tr>
<td>ECON 416</td>
<td>Mathematics for Economists</td>
</tr>
<tr>
<td>MATH 146</td>
<td>Applied Calculus I</td>
</tr>
<tr>
<td>MATH 165</td>
<td>Calculus I</td>
</tr>
<tr>
<td>MATH 166</td>
<td>Calculus II</td>
</tr>
<tr>
<td>MATH 265</td>
<td>Calculus III</td>
</tr>
<tr>
<td>MATH 266</td>
<td>Elementary Differential Equations</td>
</tr>
</tbody>
</table>

* Students seeking to prepare for graduate school in Economics are advised to choose Option B.

VI. College of Business & Public Administration Graduation Requirements:

1. Earn a minimum cumulative GPA of 2.50
2. Earn a minimum UND GPA of 2.50
3. Earn a minimum cumulative major GPA of 2.50 (business administration courses that apply toward the degree and major)
4. Earn a minimum UND major GPA of 2.50 (business administration courses that apply toward the degree and major)
5. At least half of the business courses that apply toward the degree and major must be from UND

Certificate in Applied Economics

Admission Requirements

1. A four-year bachelor’s degree from a recognized college or university.
2. An overall undergraduate grade point average of 2.75 or greater for all undergraduate work or a GPA of at least 3.0 for the junior and senior years of undergraduate work (based on A=4.0).
3. Official scores from the Graduate Record Examination (GRE) General Test or Graduate Management Admission Test (GMAT). Students with strong quantitative backgrounds, including current and former UND undergraduate STEM majors, or, students holding a graduate degree in a business or STEM related field from an AACSB accredited institution, may request a waiver of the GRE/GMAT requirement.
4. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.
5. Complete undergraduate intermediate microeconomics, one semester of calculus, and one semester of probability and statistics, or equivalent.
6. Applicants may be eligible for admission in “Qualified” status with six credits of requisite undergraduate work provided that they meet all other stated admission criteria. In such cases, the student must satisfy all conditions in her/his admission letter in order to advance to “Approved” status. Failure to address the conditions of admission as stated in the admission letter will be viewed as unsatisfactory progress and could result in dismissal from the School of Graduate Studies.

Certificate Requirements

Students seeking the Certificate in Applied Economics through the Department of Economics & Finance at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Department of Economics & Finance. The Certificate program requires the completion of the 4 graduate-level courses (for a total of 12 credits) in the Master of Science in Applied Economics (MSAE) program; listed below. Students may take additional courses in the MSAE program (or, other approved programs) for additional credits, if they wish. Certificate students may also choose to transfer to the MSAE program with the approval of the MSAE Program Director.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 416</td>
<td>Mathematics for Economists</td>
</tr>
<tr>
<td>ECON 504</td>
<td>Microeconomic Theory &amp; Applications</td>
</tr>
<tr>
<td>ECON 505</td>
<td>Macroeconomic Theory &amp; Applications</td>
</tr>
<tr>
<td>ECON 506</td>
<td>Econometrics</td>
</tr>
</tbody>
</table>

Minor in Economics

Students who are interested in obtaining a basic background in Economics to complement their chosen major course of study may elect a minor in Economics offered through the College of Business and Public Administration.

I. Required courses (15 credit hours):

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 201</td>
<td>Principles of Microeconomics</td>
</tr>
<tr>
<td>ECON 202</td>
<td>Principles of Macroeconomics</td>
</tr>
<tr>
<td>ECON 303</td>
<td>Money and Banking</td>
</tr>
<tr>
<td>ECON 308</td>
<td>Intermediate Microeconomic Theory</td>
</tr>
<tr>
<td>ECON 309</td>
<td>Intermediate Macroeconomic Theory and Policy</td>
</tr>
</tbody>
</table>

Total Credits 15

II. Economics electives (5 credit hours):

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 210</td>
<td>Introduction to Business and Economic Statistics</td>
</tr>
<tr>
<td>ECON 305</td>
<td>Principles of Banking I</td>
</tr>
<tr>
<td>ECON 324</td>
<td>Public Finance</td>
</tr>
<tr>
<td>ECON 330</td>
<td>Business and Economic History</td>
</tr>
<tr>
<td>ECON 338</td>
<td>International Economics</td>
</tr>
<tr>
<td>ECON 341</td>
<td>Labor Economics and Labor Relations</td>
</tr>
<tr>
<td>ECON 355</td>
<td>Government Regulation of Business</td>
</tr>
</tbody>
</table>

Total Credits 3

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* ECON 146 Elementary Differential Equations
  
^ ECON 495 Readings in Economics

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ECON 380 Global Economic Development 3
ECON 395 Special Topics in Economics 1-3
ECON 400 History of Economic Thought 3
ECON 405 Bank Regulation 3
ECON 409 Current Issues in Macroeconomic Policy 3
ECON 410 Empirical Methods in Economics I 3
ECON 411 Economic Forecasting 3
ECON 414 Managerial Economics 3
ECON 416 Mathematics for Economists 3
ECON 420 Economic Education 3
ECON 438 International Money and Finance 3
ECON 495 Readings in Economics 1-3
ECON 496 Research in Economics 1-3

Education and Human Development (EHD)

Courses

EHD 200. Research in the University Library. 1 Credit.
Introduction to effective library-based research. Current technologies and traditional methods are emphasized. F,S.

EHD 250A. Special Topics. 1-3 Credits.
Specially arranged seminars or courses on contemporary topics not covered by regular departmental offerings. May be initiated by students with approval of dean and departments involved, provided appropriate faculty members are willing. 1 to 3 credits in any one semester; repeatable to 12 credits. Regular grading. Repeatable to 12 credits. F,S.

EHD 250B. Special Topics. 1-3 Credits.
Specially arranged seminars or courses on contemporary topics not covered by regular departmental offerings. May be initiated by students with approval of dean and departments involved, provided appropriate faculty members are willing. 1 to 3 credits in any one semester; repeatable to 12 credits. S/U grading. Repeatable to 12 credits. F,S.

EHD 390A. Special Topics. 1-2 Credits.
May be repeated to 12 credits. Regular grading. Repeatable to 12 credits.

EHD 390B. Special Topics. 1-2 Credits.
May be repeated to 12 credits. S/U grading. Repeatable to 12 credits. S/U grading.

EHD 495A. Special Problems. 1-3 Credits.
Specially arranged seminars or courses on contemporary topics, having professional orientation and possible prerequisites not covered by regular departmental offerings. May be initiated by the students with approval of dean and department involved, provided appropriate faculty are willing. 1 to 3 credits in any one semester; repeatable to 12 credits. Regular grading. F,S.

EHD 495B. Special Problems. 1-3 Credits.
Specially arranged seminars or courses on contemporary topics, having professional orientation and possible prerequisites not covered by regular departmental offerings. May be initiated by the students with approval of dean and department involved, provided appropriate faculty are willing. 1 to 3 credits in any one semester; repeatable to 12 credits. S/U grading. S/U grading. F,S.

EHD 497. Community Concepts of Residence Hall Living. 2 Credits.
Assists Resident Assistants in gaining a more complete understanding of components of a successful residence hall environment with implications for job satisfaction and individual development. F,S.

Educational Leadership (EDL)

Courses

EDL 210. Exploring Educational Leadership. 2 Credits.
This course offers students an opportunity to explore educational leadership in the university and education community through a variety of perspectives. As a framework to explore leadership concepts, the course focuses on the consciousness of self, congruence, commitment, critical thinking, and communication as factors that contribute to leadership development. On demand.

EDL 211. Educational Leadership Skills & Techniques. 3 Credits.
This course explores both the theoretical concepts and application of educational leadership from a standpoint of the self, groups, and the community. Framed within the context of the university and surrounding educational communities, students engage in skill development and technique building exercises through experiential activities including a service learning project. On demand.

EDL 299. Special Topics in Educational Leadership. 1-3 Credits.
This course explores a special topic that is not regularly included in the available course offerings such as a current issue or concept. The primary focus of the class may vary year-to-year. Repeatable to 3 credits. F,S.

School of Electrical Engineering and Computer Science (EECS)

B.A. in Computer Science (http://und-public.coursesleaf.com/undergraduateacademicinformation/departmentalcoursesprograms/electricalengineering/cs-ba)

B.S. in Electrical Engineering (p. 91)
B.S. in Electrical Engineering with an Aerospace Focus (p. 92)
B.S. in Electrical Engineering with a Biomedical Engineering Focus (p. 93)
B.S. in Electrical Engineering with a Computer Science Focus (p. 95)
B.S. in Cyber Security (p. 91)
B.S. with Major in Computer Science (p. 78)
B.S. in Data Science (p. 77)

Minor in Electrical Engineering (p. 96)
Minor in Aviation - Professional Flight (p. 95)
Minor in Biomedical Engineering (p. 96)
Minor in Computer Science (p. 78)
Minor in Cyber Security (p. 78)

Optional Specializations (p. 78)

CSCI Courses

CSCI 101. Introduction to Computers. 3 Credits.
An overview of the fundamental concepts and applications of computer science. Topics include data storage, hardware, operating systems, and programming principles. Corequisite: CSCI 101T is recommended. F,S,SS.

CSCI 110. Introduction to Computer Science. 3 Credits.
This is an introductory course for prospective computer science majors as well as offering an introduction to computing for non-computer science majors. Students will receive a broad introduction to the discipline of computer science without the immersion into a programming language. Students will learn to write interactive Web-based programs. No previous computing or programming experience is assumed. F,S,SS.
CSCI 120. Computer Programming I. 4 Credits.
An introduction to computer programming in a high-level language, with emphasis on problem solving and logical thinking. Students learn to design, implement, test, and debug programs for small-scale problems using elementary data types and control structures. Includes laboratory. On demand.

CSCI 130. Introduction to Scientific Programming. 4 Credits.
An introduction to scientific computing, with problem solving, algorithm development, and structured programming in a high-level language with an engineering and mathematical focus. Emphasis on learning how to design, code, debug, and document programs, using techniques of good programming style. Includes laboratory. F.S.S.

CSCI 160. Computer Science I. 4 Credits.
An introduction to computer science, with problem solving, algorithm development, and structured programming in a high-level language. Emphasis on learning how to design, code, debug, and document programs, using techniques of good programming style. Includes laboratory. F.S.S.S.

CSCI 160L. Computer Prog I Lab.
Computer Programming I Lab.

CSCI 161. Computer Science II. 4 Credits.
A broadening of foundations for computer science with advanced concepts in computer programming. Includes an introduction to data structures, analysis of algorithms, and the theory of computation. Includes laboratory. Prerequisites: CSCI 130 with a grade of C or better or CSCI 160 with a grade of C or better, and MATH 103 or MATH 107; concurrent enrollment in MATH 208 is recommended. S.

CSCI 161L. Computer Prog II Lab.
Computer Programming II Lab.

CSCI 170. Computer Programming II. 4 Credits.
Advanced techniques in computer programming using a high-level language. Topics include the use of recursion, pointers, and fundamental data structures in developing small to medium-scale programs. Includes laboratory. Prerequisite: CSCI 120. On demand.

CSCI 199. Topics in Computing. 1-3 Credits.
Selected introductory-level topics in computing for students of all majors. Course may be repeated to 6 credits with different topics. Repeatable to 6 credits. On demand.

CSCI 230. Systems Programming. 3 Credits.
Focus on low level programming. Topics covered include pointers, memory management, dynamic memory, code optimization, compiling and linking, and library development. Weekly programming assignments. Prerequisite: CSCI 161 with a grade of C or better. F.S.

CSCI 242. Algorithms and Data Structures. 3 Credits.
Object-oriented implementations of complex data structures including lists, sets, trees, and graphs. Time and space analysis and classification of algorithms using upper bounds (big Oh), lower bounds (big Omega), and exact bounds (big Theta). Techniques for analysis of recursive algorithms including use of the "Master Theorem" for divide-and-conquer recurrences. Prerequisites: CSCI 161 with a C or better and MATH 208. F.S.

CSCI 260. Advanced Programming Languages. 3 Credits.
Programming in a specific high-level language for students who are already proficient at programming in another high-level language. Course may be repeated for different languages. A student may not receive credit for both CSCI 260 and a 100-level programming course in the same language. Prerequisite: CSCI 161 or consent of instructor. Repeatable. F.

CSCI 270. Programming for Data Science. 3 Credits.
The Programming for Data Science course provides students with an introduction to the main tools and ideas in the data scientist's toolbox. The course gives an overview of the data, questions, techniques and tools that data analysts and data scientists work with. This course provides a conceptual introduction to the ideas behind turning data into actionable knowledge and tools that will be used to analyze this data. The course will cover collecting, cleaning and sharing data. Additionally, this course will cover how to communicate results through visualizations. Prerequisite: CSCI 161 with a grade of C or better. S.

CSCI 280. Object Oriented Programming. 3 Credits.
An introduction to the concept and execution of Object-Oriented programming, using the Java language. Includes an introduction to object creations, classes, inheritance, interfaces, exceptions, overloading, and more. Prerequisite: CSCI 161 with a C or better.

CSCI 289. Social Implications of Computer Technology. 3 Credits.
An introduction to the effects of computer technology on society and individuals and to ethical problems faced by computer professionals. Topics covered include privacy, the nature of work, centralization versus decentralization and the need for human factors analysis in the development of a new computer system. F.

CSCI 290. Cyber-Security and Information Assurance. 3 Credits.
An introduction covering the breadth of essential Cyber-Security and Information Assurance topics. Students will hone skills in observation, deduction, analysis, logical reasoning and critical thinking as they gain experience with non-technical and lightly technical aspects of Cyber-Security and Information Assurance through practical and real-world examples. S.

CSCI 297. Experiential Learning. 1-3 Credits.
A practical experience in which students offer their proficiency in computing as a resource or service for others. The experience may involve software development, software consulting and assistance, system administration, or instruction. Prerequisite: CSCI 161. Repeatable to 6 credits. S/U grading. F.

CSCI 299. Topics in Computer Science. 1-3 Credits.
Selected intermediate-level topics in computer science for students with some experience or previous coursework in computing. Course may be repeated up to 6 credits with different topics. Repeatable to 6 credits. On demand.

CSCI 327. Data Communications. 3 Credits.
An introduction to the concepts of data transmission, communication hardware and protocols, communication software and the design, performance and management of computer networks. Prerequisites: CSCI 230 and MATH 208. F.

CSCI 363. User Interface Design. 3 Credits.
A study of the design and implementation of user interfaces for software applications. Students will apply principles of interface design to build applications using a toolkit of graphical interface components. Required coursework includes a team project. Prerequisite: CSCI 280 with a grade of C or better. F.

CSCI 364. Concurrent and Distributed Programming. 3 Credits.
This course focuses on concurrent object oriented programming and modern distributed/parallel programming models (such as OpenMP, CUDA, OpenCL and Actors). Students will utilize various high performance distributed computing technology. Topics covered will include shared and distributed memory systems, sockets, threads, and message passing. Prerequisites: CSCI 242 with a grade of C or better and CSCI 230 with a grade of C or better. S.

CSCI 365. Organization of Programming Languages. 3 Credits.
Compile and run time requirements of programming languages, parameter passing and value binding techniques, Vector and stack processing. Prerequisite: CSCI 242 with a grade of C or better. S.

CSCI 370. Computer Architecture. 4 Credits.
Computer structure, machine presentation of numbers and characters, instruction codes and assembly systems. Introduction to hardware methodologies and software extensions to hardware in computers. Some topics on hardware and software selection will be discussed. Prerequisites: CSCI 230 with a grade of C or better, EE 201, and EE 201L. S.

CSCI 384. Artificial Intelligence. 3 Credits.
A study of algorithms and application of AI. The topics include agent theory, problem-solving with the search, constraint satisfaction problems, game, knowledge-based systems, reasoning and machine learning which are widely applicable to design of an intelligent system, data science and mining, information retrieval, pathfinding and classification, etc. Prerequisite: CSCI 242. SS, even years.

CSCI 387. Secure Software Engineering. 3 Credits.
This course provides fundamental knowledge of secure software development methodologies and applied security topics related to compiled programs. In-depth coverage of source code auditing, fuzzing, introduction to reverse engineering, and exploitation will be emphasized. F.

CSCI 388. Exploit Analysis and Development. 3 Credits.
Provides fundamental knowledge of Malware analysis. Topics include an introduction to both static and dynamic techniques for analyzing suspect binaries. Students will be exposed to advanced malware concepts including malware detection as well as the utilization of industry standard tools to analyze, debug, and reverse engineer suspect binaries. F.
CSCI 389. Computer and Network Security. 3 Credits.
This course introduces techniques for achieving security in multi-user standalone computer systems and distributed computer systems. Coverage includes host-based security topics (cryptography, intrusion detection, secure operating systems), network-based security topics (authentication and identification schemes, denial-of-service attacks, worms, firewalls), risk assessment and security policies. Prerequisite: CSCI 161. S.

CSCI 397. Cooperative Education. 1-2 Credits.
A practical work experience with an employer closely associated with the student's academic area. Arranged by mutual agreement among student, department, employer, and the UND Cooperative Education office. Repeatable to 6 credits. Prerequisites: Declared Computer Science major with at least 15 completed credits in CSCI including CSCI 230 and CSCI 242. Repeatable to 6 credits. S/U grading. F, S, SS.

CSCI 399. Topics in Computer Science. 1-3 Credits.
Selected topics in Computer Science which allow students to study specialized subjects. Repeatable to 12 credits. Prerequisite: Consent of instructor. Repeatable to 12 credits. On demand.

CSCI 427. Cloud Computing. 3 Credits.
This is the undergraduate-level course on cloud computing models, techniques, and architectures. Cloud computing is an important computing model which enables information, software, and other shared resources to be provisioned over the network as services in an on-demand manner. This course introduces the current practices in cloud computing. Topics may include distributed computing models and technologies, Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS), Software-as-a-Service (SaaS), virtualization, performance and systems issues, capacity planning, disaster recovery, Cloud OS, federated clouds, challenges in implementing clouds, data centers, hypervisor CPU and memory management, and cloud hosted applications. S, even years.

CSCI 435. Formal Languages and Automata. 3 Credits.
A study of automata, grammars, and Turing machines as specifications for formal languages. Computation is defined in terms of deciding properties of formal languages, and the fundamental results of computability and decidability are derived. Prerequisites: CSCI 242 with a grade of C or better and minimum second semester junior standing. F.

CSCI 445. Mathematical Modeling and Simulation. 3 Credits.
A study of various mathematical applications for digital computers, including the modeling, simulation and interpretation of the solution of complex systems. Prerequisites: CSCI 161 or CSCI 170, and MATH 166 and a statistics course. F, even years.

CSCI 446. Computer Graphics I. 3 Credits.
Introduction to computer graphics. Topics include raster scan graphics, 2D and 3D representations, affine transformations, light and color, texture mapping, image processing, ray-tracing, and computer animation. Team-based weekly homework develops a 4 minute computer animation. Prerequisites: CSCI 242, CSCI 363, and MATH 166. F, odd years.

CSCI 448. Computer Graphics II. 3 Credits.
A continuation of CSCI 446. Topics covered include: history of games, game taxonomies, game design theory, computer game development, physics engines and AI engines. Prerequisite: CSCI 446. S, even years.

CSCI 451. Operating Systems I. 3 Credits.
Introduction to operating system theory and fundamentals. Topics include: CPU scheduling, memory management, file systems, interprocess communication facilities, security. Weekly homework assignments focus on process synchronization using fork/exe, threads, mutexes, pipes, semaphores, and shared memory. Prerequisites: CSCI 242 and CSCI 370; both with a grade of C or better. F.

CSCI 452. Operating Systems II. 3 Credits.
A study of the implementation of operating systems and parts of operating systems, and development of system software. Prerequisites: CSCI 451. On demand.

CSCI 455. Database Management Systems. 3 Credits.
Database concepts, database design (ER, UML), database programming languages (SQL), NoSQL Database, Database Concurrency and recovery techniques, and Database security. Prerequisite: CSCI 242 with a grade of C or better. S, even years.

CSCI 457. Electronic Commerce Systems. 3 Credits.
A study of the system architecture, content design and implementation, and data analysis, management, and processing of electronic commerce. Topics include Internet basics, business issues, data management and processing, static and dynamic web programming, e-commerce content design and construction, and databases and host languages with embedded SQL. Prerequisite: CSCI 260 with course topic of Dot Net. S, odd years.

CSCI 463. Software Engineering. 3 Credits.
This course teaches software engineering principles and techniques used in the specification, design, implementation, verification and maintenance of large-scale software systems. Major software development methodologies are reviewed. As development team members, students participate in a group project involving the production or revision of a complex software product. Prerequisites: CSCI 242 and CSCI 363. S.

CSCI 465. Principles of Translation. 3 Credits.
Techniques for automatic translation of high-level languages to executable code. Prerequisites: CSCI 365 and CSCI 370. F, odd years.

CSCI 487. Penetration Testing. 3 Credits.
Provides theoretical and practical aspects of Network Penetration Testing. The course includes in-depth details and hands on labs for each of the five distinct phases of an ethical hack including reconnaissance, scanning and vulnerability assessment, gaining access and exploitation, maintaining access, and covering tracks. An applied approach with a focus on current tools and methodologies will be stressed. S.

CSCI 491. Seminars in Computer Science. 1 Credit.
A course for advanced students. Repeatable to 3 credits. Prerequisite: Consent of instructor. Repeatable to 3 credits. S/U grading. F, S.

CSCI 492. Senior Project I. 3 Credits.
The first course in a two-semester sequence in which computer science majors undertake a culminating research or software development project. The course requires written documents, oral presentations, and peer review for the initial phases of the project, including a project proposal, a review of previous work, and a complete software design or research plan. Prerequisites: CSCI 242 and at least second-semester junior standing. F.

CSCI 493. Senior Project II. 1 Credit.
The second course in a two-semester sequence in which computer science majors undertake a culminating research or software development project. The course requires written documents and oral presentations/demonstrations for both a preliminary and a final review of the completed project. Prerequisite: CSCI 492. S.

CSCI 494. Special Projects in Computer Science. 1-3 Credits.
A course for advanced students. 1-3 credits varying with the choice of project. May be repeated (6 credits maximum). Prerequisite: Consent of instructor. Repeatable to 6 credits. F, S.

EE Courses

EE 101. Introduction to Electrical Engineering. 1 Credit.
An introduction to the electrical engineering discipline. Recent technologies and practices in electronics, computers, controls, power systems, robotics, communication, and microwaves. F, S.

EE 201. Introduction to Digital Electronics. 2 Credits.
Introduction to the fundamentals of digital circuits design. Logic gates; Boolean algebra; Karnaugh maps; Mathematical operations; Flip Flops; Counters. Corequisite: EE 201L. F, S.

EE 201L. Digital Electronics Laboratory. 1 Credit.
Introduction to design and implementation of digital electronic circuits. Corequisite: EE 201. F, S.

EE 206. Circuit Analysis. 3 Credits.
Introduces the foundations of electrical engineering, applying these concepts in developing the fundamentals of energy conversion, electronics and circuit theory. Prerequisite: MATH 165 with a grade of C or better; EE Major should be declared. F.

EE 206L. Circuits Laboratory I. 1 Credit.
Introduction to methods of experimental circuit analysis and to proper uses of laboratory equipment. Prerequisite: EE major should be declared. Corequisite: EE 206. F, S. S.
EE 304. Computer Aided Measurement and Controls. 3 Credits.
The principles of the use of a computer in a measurement and control environment are presented. Software is designed to drive interfaces to perform measurement and control algorithms. The software and concepts presented are evaluated in a laboratory environment. Prerequisites: Electrical Engineering major and MATH 165. F.

EE 313. Linear Electric Circuits. 3 Credits.
Linear electric circuits in the steady state and transient conditions; two-port circuits; Fourier Series single and polyphase systems. Prerequisites: Electrical Engineering major and EE 206 with a grade of C or better. Corequisite: EE 313L. S.

EE 313L. Circuits Laboratory II. 1 Credit.
Experimental circuit analysis and proper uses of laboratory equipment. Prerequisites: Electrical Engineering major and EE 206L. Corequisite: EE 313. S, SS.

EE 314. Signals and Systems. 3 Credits.
Passive filters; Laplace transform applications; Fourier transform; Z-transform; Nyquist sampling theorem; other topics as time permits (state variables; introduction to control and communications theory; discrete Fourier transform). Prerequisite: EE 313. Corequisite: MATH 266 and EE 314L. F.

EE 314L. Signal and Systems Laboratory. 1 Credit.
In this laboratory course, students will conduct simulations and experiments related to theory covered in EE 314. The topics include implementation of passive filters, Laplace transform, and Z-transform. Corequisite: EE 314. F.

EE 316. Electric and Magnetic Fields. 3 Credits.
Field produced by simple distributions of electric charges and magnetic poles, field mapping and application to engineering problems. Prerequisites: EE 206 with a grade of C or better. Corequisite: MATH 266. F.

EE 318. Engineering Data Analysis. 3 Credits.
This course will provide undergraduate electrical engineering students with an understanding of the principles of engineering data analysis using basic probability theory and basic statistics theory. Students will have the opportunity to apply these concepts to actual engineering applications and case studies. Prerequisites: EE 206 with a grade of C or better. Corequisite: EE 313. F.

EE 321. Electronics I. 3 Credits.
Fundamentals of semiconductors, nonlinear discrete components such as diodes and transistors, and integrated circuits; analysis and synthesis of simple electronic circuits, including amplifiers. Prerequisite: EE 313. Corequisite: EE 321L. F.

EE 321L. Electronics Laboratory I. 1 Credit.
Practical electronics application and design using theory studied in concurrent third year electrical engineering courses. Prerequisite: EE 313L. Corequisite: EE 321. F.

EE 397. Cooperative Education. 1-2 Credits.
A practical work experience with an employer closely associated with the student's academic area. Arranged by mutual agreement among student, department, and employer. Repeatable to 24 credits. Prerequisite: Admission to the electrical engineering degree program; a cumulative GPA of 2.0 or higher is required. Repeatable to 24 credits. S/U grading. F, S, SS.

EE 401. Electric Drives. 3 Credits.
A study of variable speed drives and their electronic controls; analysis and synthesis of power electronics through computer simulations and laboratory implementations. Prerequisite: EE 314. Corequisite: EE 401L. S.

EE 401L. Electric Drives Laboratory. 1 Credit.
The course provides the basic knowledge required for the usage and the design of the most common electrical drives. This lab focuses on the Electric Drives and their control in a real time environment using dSPACE and/or similar digital signal processing based methods and simulations. Corequisite: EE 401. S.

EE 405. Control Systems I. 3 Credits.
Mathematical modeling and dynamic response of linear control systems; stability analysis; design of linear controllers using the root locus and frequency response techniques. Prerequisite: EE 314 and MATH 266. Corequisite: EE 405L. S.

EE 405L. Control Systems Laboratory. 1 Credit.
Experiments and simulations related to theory discussed in EE 405 are implemented in this laboratory course. The topics included mathematical modeling and dynamic response of linear systems; stability analysis; and design of controllers. Corequisite: EE 405. S.

EE 409. Distributed Networks. 3 Credits.
Fundamentals of transmission lines. Prerequisite: EE 313 and EE 316. S.

EE 411. Communications Engineering. 3 Credits.
Mathematical definition of random and deterministic signals and a study of various modulation systems. Prerequisite: EE 314. On demand.

EE 421. Electronics II. 3 Credits.
Analysis of electronic circuits and systems using discrete components and integrated circuits, digital circuits, active filters, and power amplifiers. Prerequisite: EE 314 and EE 321. Corequisite: EE 421L. S.

EE 421L. Electronics Lab II. 1 Credit.
Practical electronics application and design using theory studied in concurrent third year electrical engineering courses. Prerequisite: EE 321L. Corequisite: EE 421. S.

EE 423. Power Systems I. 3 Credits.
Electric power systems operation, control and economic analysis. Prerequisite: EE 313. On demand.

EE 424. Electronic Circuits. 3 Credits.
Principles, applications, and design of electronic equipment studied from viewpoint of complete systems. Prerequisite: EE 321. On demand.

EE 428. Robotics Fundamentals. 3 Credits.
Fundamentals of robotic systems: modeling, analysis, design, planning, and control. The project provides hands-on experience with robotic systems. Prerequisite: MATH 266 or consent of instructor. On demand.

EE 430. Introduction to Antenna Engineering. 3 Credits.
Review of vector analysis and Maxwell's equations, wave propagation in unbounded regions, reflection and refraction of waves, fundamental antenna concepts, wire- and aperture-type antennas, wave and antenna polarization, antenna measurements, and computer-aided analysis. Prerequisite: EE 409 or consent of instructor. On demand.

EE 434. Microwave Engineering. 3 Credits.
Review of transmission lines and plane waves, analysis of microwave networks and components using scattering matrices, analysis of periodic structures, transmission and cavity type filters, high frequency effects, microwave oscillators, amplifiers, and microwave measurement techniques. Prerequisite: EE 409 or consent of instructor. On demand.

EE 451. Computer Hardware Organization. 3 Credits.
The study of complete computer systems including digital hardware interconnection and organization and various operation and control methods necessary for realizing digital computers and analog systems. Prerequisite: EE 201 and EE 304; or consent of instructor. On demand.

EE 452. Embedded Systems. 3 Credits.
A study of microcontroller hardware and software, with an emphasis on interfacing the microcontroller with external electronic devices such as transceivers, sensors, and actuators for communications and control within an embedded system. Prerequisite: EE 201, EE 304 and EE 321. Corequisite: EE 452L. S.

EE 452L. Embedded Systems Design Laboratory. 1 Credit.
This introductory laboratory course provides students with the hands-on activities in order to learn and gain more experiences in designing embedded systems (smart systems) using microcontrollers, actuators, and sensors. Prerequisites: EE 201 and EE 304 or consent of instructor. Prerequisite or corequisite: EE 452. S.

EE 456. Digital Image Processing. 3 Credits.
Digital image retrieval, modification, enhancement, restoration, and storage. Image transformation and computer vision. The associated laboratory provides hands-on experiences. Prerequisite: EE 304 and EE 314. On demand.

EE 480. Senior Design I. 3 Credits.
First course in the two-semester capstone design experience for the electrical engineering undergraduate degree, emphasizing design methodologies, advanced communication, and teamwork. Student teams will select an electronic system to design, capture end-user requirements, and perform component trade studies, resulting in an oral and written critical design review at the end of the semester. EE 480 Senior Design I meets the Essential Studies Special Emphasis requirements for Advanced Communication (A) and Senior Capstone (C). Prerequisites: EE 309 and EE 421 and two out of the four following classes: EE 401, EE 405, EE 409, EE 452. F.
Bachelor of Science in Cyber Security

This program prepares students who have a strong interest related to the field of cyber-physical security systems.

Admission Requirements

All of the general UND requirements for undergraduate enrollment, participation, and completion of a degree shall be required.

Degree Requirements

Required curriculum (120 credits):

1. Electrical Engineering (43 credits):
   EE 201 Introduction to Digital Electronics  2
   EE 206 Circuit Analysis  3
   EE 206L Circuits Laboratory I  1
   EE 304 Computer Aided Measurement and Controls  3
   EE 313 Linear Electric Circuits  3
   EE 313L Circuits Laboratory II  1
   EE 314 Signals and Systems  3
   EE 314L Signal and Systems Laboratory  1
   EE 318 Engineering Data Analysis  3
   EE 321 Electronics I  3
   EE 321L Electronics Laboratory I  1
   EE 405 Control Systems I  3
   EE 405L Control Systems Laboratory  1
   EE 421 Electronics II  3
   EE 421L Electronics Lab II  1
   EE 480 Senior Design I  3
   EE 481 Senior Design II  3

2. Electrical Engineering electives with a focus on Cyber Security (15 credits from the following):
   EE 508 Intelligent Decision Systems  3
   EE 526 Systems Reliability  3
   EE 534 Advanced Wireless Communications Engineering  3
   EE 540 Computer Networks  3
   EE 542 Network Architecture  3
   EE 551 Cryptography Techniques and their VLSI Implementations  3
   EE 552 Advanced Embedded Systems Design  3
   EE 611 Emerging Threats and Defenses  3
   EE 612 Spread Spectrum Communications for Cyber Security  3
   EE 613 Advanced Cyber Security Principles  3
   EE 615 Cyber Forecasting  3
   EE 616 Cyber-Physical Energy Systems Security  3
   EE 617 Data Operations and Security  3

3. Electives from other departments (15 credits from the following):
   CSCI 130 Introduction to Scientific Programming  4
   or CSCI 160 Computer Science I  4
   CSCI 161 Computer Science II  4
   CSCI 230 Systems Programming  3
   CSCI 387 Secure Software Engineering  3
   CSCI 389 Computer and Network Security  3
   CSCI 388 Exploit Analysis and Development  3
   CSCI 487 Penetration Testing  3
   CJ 320 Cybersecurity Law and Investigations  3
   MATH 208 Discrete Mathematics  3
   MATH 425 Cryptological Mathematics  3
   PSYC 301 Industrial and Organizational Psychology  3
   PSYC 370 Cyber Security, Big Data, & Human Behavior  3
   PSYC 372 Behavioral Design & Digital Products  3
   PSYC 433 Psychology of Learning  4
   PSYC 436 Perception  4
   PSYC 439 Cognitive Psychology  4

4. Required courses from other departments (55 credits):
   MATH 165 Calculus I  4
   MATH 166 Calculus II  4
   MATH 265 Calculus III  4
   MATH 266 Elementary Differential Equations  3
   PHYS 251 University Physics I  4
   PHYS 252 University Physics II  4
   ENGL 140 College Composition I  3
   ENGL 140 Composition II: Writing for Public Audiences  3
   ENGR 160 Engineering Economy  3
   Essential Studies (Social Science)  9
   Essential Studies (Arts & Humanities)  9

Total Credit Hours 120

Bachelor of Science in Electrical Engineering

Required 125 credits (36 of which must be numbered 300 or above and 60 of which must be from a 4-year institution) including:

I. The University’s Essential Studies Breadth of Knowledge, Social-Cultural Diversity, and Special Emphasis Requirements (refer to the online Academic Catalog for a listing of acceptable Essential Studies courses).

II. The Following Curriculum:

Freshman Year

First Semester

<table>
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<th>Course</th>
<th>Credits</th>
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<tr>
<td>CHEM 121</td>
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<td>EE 101</td>
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<td>ENGL 110</td>
<td>3</td>
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<td>MATH 165</td>
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Social Sciences Elective (SS) 3

Humanities Elective (A&H) 3

Credits 18
Bachelor of Science in Electrical Engineering with Aerospace Focus

Required 129 credits (36 of which must be numbered 300 or above, and 60 of which must be from a 4-year institution) including:

I. The University's Essential Studies Breadth of Knowledge, Social-Cultural Diversity, and Special Emphasis Requirements (refer to the online Academic Catalog for a listing of acceptable Essential Studies courses).

II. The Following Curriculum

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<td>CHEM 121</td>
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<td>EE 101</td>
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<td>EE 201</td>
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<td>MATH 165</td>
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Total Credits: 125

Second Semester

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<td>EE 101</td>
<td>Introduction to Electrical Engineering</td>
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Total Credits: 125

Sophomore Year

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<td>ENGL 112</td>
<td>Composition II: Writing for Public Audiences</td>
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<td>MATH 265</td>
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<td>PHYS 252</td>
<td>University Physics II</td>
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Second Semester

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<tr>
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<td>Circuit Analysis</td>
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<td>EE 206L</td>
<td>Circuits Laboratory I</td>
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<tr>
<td>ENGL 113</td>
<td>Composition II: Writing for Public Audiences</td>
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<td>MATH 266</td>
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Junior Year

First Semester

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<td>EE 316</td>
<td>Electric and Magnetic Fields</td>
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<td>EE 318</td>
<td>Engineering Data Analysis</td>
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<td>EE 321</td>
<td>Electronics I</td>
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Second Semester

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<td>EE 319</td>
<td>Signals and Systems</td>
<td>3</td>
</tr>
<tr>
<td>EE 320</td>
<td>Electronics II</td>
<td>3</td>
</tr>
<tr>
<td>EE 320L</td>
<td>Electronics II</td>
<td>1</td>
</tr>
<tr>
<td>EE 320L</td>
<td>Embedded Systems Design Laboratory</td>
<td>1</td>
</tr>
</tbody>
</table>

Senior Year

First Semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 480</td>
<td>Senior Design I</td>
<td>3</td>
</tr>
<tr>
<td>EE 481</td>
<td>Senior Design II</td>
<td>3</td>
</tr>
</tbody>
</table>

Second Semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 482</td>
<td>Senior Design II</td>
<td>3</td>
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<tr>
<td>EE 482L</td>
<td>Senior Design II</td>
<td>1</td>
</tr>
<tr>
<td>ENGL 112</td>
<td>Composition II: Writing for Public Audiences</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits: 125

Some of the following courses may be waived by completing: ENGR 102
Bachelor of Science in Electrical Engineering with Biomedical Engineering Focus

Required 128 credits (36 of which must be numbered 300 or above and 60 of which must be from a 4-year institution) including:

I. The University’s Essential Studies Breadth of Knowledge, Social-Cultural Diversity, and Special Emphasis Requirements (refer to the online Academic Catalog for a listing of acceptable Essential Studies courses).

II. The Following Curriculum:

**Freshman Year**

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 150 General Biology I</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 150L General Biology I Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 121 General Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 121L General Chemistry I Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>EE 101 Introduction to Electrical Engineering</td>
<td>1</td>
</tr>
</tbody>
</table>

**Sophomore Year**

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 121 General Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 121L General Chemistry I Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>EE 101 Introduction to Electrical Engineering</td>
<td>1</td>
</tr>
</tbody>
</table>

**Junior Year**

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 101 Introduction to Electrical Engineering</td>
<td>1</td>
</tr>
</tbody>
</table>

**Senior Year**

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 101 Introduction to Electrical Engineering</td>
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</tr>
</tbody>
</table>

**Second Semester**

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 101 Introduction to Electrical Engineering</td>
<td>1</td>
</tr>
</tbody>
</table>

**Third Semester**

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 101 Introduction to Electrical Engineering</td>
<td>1</td>
</tr>
</tbody>
</table>

**Fourth Semester**

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 101 Introduction to Electrical Engineering</td>
<td>1</td>
</tr>
</tbody>
</table>

**Electives**

- 3 credits of Global (G) Diversity Electives (minimum of 2 departments, including 3 Fine Arts credits and 3 Humanities credits) and 9 credits of Social Sciences Electives (minimum of 2 departments). Refer to the online Academic Catalog for a listing of acceptable Essential Studies courses.
- To meet the University’s Essential Studies Social-Cultural Diversity requirements, all students must complete 3 credits of Global (G) Diversity Electives and 3 credits of United States (U) Diversity Electives. Refer to the online Academic Catalog for a listing of acceptable Essential Studies courses.
- To meet the University’s Essential Studies Breadth of Knowledge requirements, all students must complete 9 credits of Arts & Humanities Electives (minimum of 2 departments, including 3 Fine Arts credits and 3 Humanities credits) and 9 credits of Social Sciences Electives (minimum of 2 departments). Refer to the online Academic Catalog for a listing of acceptable Essential Studies courses.

May be waived for transfer students (substitute science credit required).

- Maximum of three credits of EE 490 Advanced EE Problems allowed as an independent study, applicable to both EE and non-EE Electives. 1-2 credits of EE 397 Cooperative Education (40 hours/week) is equivalent to 3 credits of the EE Electives with S/U grading, maximum 4 credits of EE 397 is equivalent to maximum of 6 credits of EE Elective.

- The Ethics Elective is a 3-credit course that meets Essential Studies requirements in either the Arts & Humanities or the Social Sciences. Ethics Elective choices: Phil 120 Introduction to Ethics, Humanities, CHE 340 The Role of Engineers and Applied Scientists in a Global Society, and ME 370 Engineering Disasters & Ethics.

- Total of 6 credit hours of Aviation Electives: Recommended courses are: Avit 250-Human Factors, Avit 309-Flight Physiology, Avit 324-Aircraft Systems, and Avit 428-Transport Category Aircraft Systems.

I. The University's Essential Studies Breadth of Knowledge, Social-Cultural Diversity, and Special Emphasis Requirements (refer to the online Academic Catalog for a listing of acceptable Essential Studies courses).
ENGL 110 College Composition I 3
MATH 165 Calculus I 4
Credits 16

Second Semester
BIOL 151 General Biology II 3
BIOL 151L General Biology II Laboratory 1
EE 201 Introduction to Digital Electronics 2
EE 201L Digital Electronics Laboratory 1
MATH 166 Calculus II 4
PHYS 251 University Physics I 4
Credits 15

Sophomore Year
First Semester
EE 206 Circuit Analysis 3
EE 206L Circuits Laboratory I 1
EE 304 Computer Aided Measurement and Controls 3
ENGL 130 Composition II: Writing for Public Audiences 3
MATH 265 Calculus III 4
PHYS 252 University Physics II 4
Credits 18

Second Semester
ANAT 204 Anatomy for Paramedical Personnel 3
EE 313 Linear Electric Circuits 3
EE 313L Circuits Laboratory II 1
ENGR 460 Engineering Economy (SS) 2 3
MATH 266 Elementary Differential Equations 3
PSYC 111 or SOC 110 3
Introduction to Psychology (Social Science (SS)) 2 3
or Introduction to Sociology

Credits 16

Junior Year
First Semester
EE 314 Signals and Systems 3
EE 314L Signal and Systems Laboratory 1
EE 316 Electric and Magnetic Fields 3
EE 318 Engineering Data Analysis 3
EE 321 Electronics I 3
EE 321L Electronics Laboratory I 1
PPT 301 Human Physiology 4
Credits 18

Second Semester
EE 405 Control Systems I 3
EE 405L Control Systems Laboratory 1
EE 409 Distributed Networks 3
EE 421 Electronics II 3
EE 421L Electronics Lab II 1
EE 452 Embedded Systems 3
EE 452L Embedded Systems Design Laboratory 1
Credits 15

Senior Year
First Semester
EE 480 Senior Design I 5
Electrical Engineering Elective 7 3
Electrical Engineering Elective 7 3
Humanities (A&H) 2 3 3
Fine Arts Elective (A&H) 2 3 3
Credits 15

Second Semester
EE 481 Senior Design II 6 3
Electrical Engineering Elective 7 3
Non-EE Elective 4 3
Ethics Elective (A&H or SS) 2 3 8 3

A&H or SS Elective 2 3 3
Credits 15
Total Credits 128

Additional Recommended Pre-Medical Courses
ANAT 204L Anatomy for Paramedical Personnel Laboratory 2
BIOL 315 Genetics 3
BIOL 369 Histology 4
& 369L and Histology Lab
BIOL 420 Neuroscience 3
BMB 301 Biochemistry 3
CHEM 341 Organic Chemistry I 3
CHEM 341L Organic Chemistry I Laboratory (Chem 341/341L required for UND Medical School) 1
CHEM 342 Organic Chemistry II 3
CHEM 342L Organic Chemistry II Laboratory (Chem 342/342L required for UND Medical School) 1
MBIO 302 General Microbiology Lecture 2
MBIO 302L General Microbiology Laboratory 2

1 May be waived for transfer students (substitute science credit required).
2 To meet the University’s Essential Studies Breadth of Knowledge requirements, all students must complete 9 credits of Arts & Humanities Electives (minimum of 2 departments, including 3 Fine Arts credits and 3 Humanities credits) and 9 credits of Social Sciences Electives (minimum of 2 departments). Refer to the online Academic Catalog for a listing of acceptable Essential Studies courses.
3 To meet the University’s Essential Studies Social-Cultural Diversity requirements, all students must complete 3 credits of Global (G) Diversity Electives and 3 credits of United States (U) Diversity Electives. Refer to the online Academic Catalog for a listing of acceptable Essential Studies G and U Diversity Electives.
5 EE 480 Senior Design I, meets the Essential Studies Special Emphasis requirements for Advanced Communication (A) and Senior Capstone (C). EE 480 Prerequisites: EE 421 and EE 421L and two out of the four following classes: EE 401, EE 405, EE 409, EE 452.
6 EE 481 Senior Design II, meets the Essential Studies Special Emphasis requirement for Oral Communication (O).
7 Maximum of three credits of EE 490 Electrical Engineering Problems, are allowed as an independent study, applicable to both EE and non EE electives. Recommended EE Elective: EE 550 Biomedical Instrumentation. 2 credits of EE 397 Cooperative Education (40 hours/week) is equivalent to 3 credits of the EE Electives with S/U grading, maximum 4 credits of EE 397 is equivalent to maximum of 6 credits of EE Elective.
8 The Ethics Elective is a 3-credit course that meets Essential Studies requirements in either the Arts & Humanities or the Social Sciences. Ethics Elective choices: PHIL 250 Ethics in Engineering and Science (A&H, Humanities); PHIL 251 Ethics in Health Care (A&H, Humanities); and ME 370 Engineering Disasters and Ethics (SS).

III-Grade of “C” or better in all EE courses required for graduation.
Bachelor of Science in Electrical Engineering with Computer Science Focus

Required 129 credits (36 of which must be numbered 300 or above, and 60 of which must be from a 4-year institution) including:

I. The University’s Essential Studies Breadth of Knowledge, Social-Cultural Diversity, and Special Emphasis Requirements (refer to the online Academic Catalog for a listing of acceptable Essential Studies courses).

II. The Following Curriculum:

Freshman Year

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 121</td>
<td>3</td>
</tr>
<tr>
<td>General Chemistry I</td>
<td></td>
</tr>
<tr>
<td>CHEM 121L</td>
<td>1</td>
</tr>
<tr>
<td>General Chemistry I</td>
<td></td>
</tr>
<tr>
<td>CSCI 130 or CSCI 160</td>
<td>4</td>
</tr>
<tr>
<td>Introduction to Scientific Programming</td>
<td></td>
</tr>
<tr>
<td>EE 101</td>
<td>1</td>
</tr>
<tr>
<td>Introduction to Electrical Engineering</td>
<td></td>
</tr>
<tr>
<td>ENGL 110</td>
<td>3</td>
</tr>
<tr>
<td>College Composition</td>
<td></td>
</tr>
<tr>
<td>MATH 165</td>
<td>4</td>
</tr>
<tr>
<td>Calculus I</td>
<td></td>
</tr>
<tr>
<td>Humanities Elective (A&amp;H)</td>
<td>3</td>
</tr>
<tr>
<td>Credits</td>
<td>19</td>
</tr>
</tbody>
</table>

Second Semester

| CSCI 161                | 4       |
| Computer Science II     |         |
| EE 201                  | 2       |
| Introduction to Digital Electronics | |
| EE 201L                 | 1       |
| Digital Electronics Laboratory | |
| ENGL 130               | 3       |
| Composition II: Writing for Public Audiences | |
| MATH 166               | 4       |
| Calculus II             |         |
| Fine Arts Elective (A&H) | 3   |
| Credits                 | 17      |

Sophomore Year

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSCI 230</td>
<td>3</td>
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<tr>
<td>Systems Programming</td>
<td></td>
</tr>
<tr>
<td>EE 206</td>
<td>3</td>
</tr>
<tr>
<td>Circuit Analysis</td>
<td></td>
</tr>
<tr>
<td>EE 206L</td>
<td>1</td>
</tr>
<tr>
<td>Circuits Laboratory I</td>
<td></td>
</tr>
<tr>
<td>EE 304</td>
<td>3</td>
</tr>
<tr>
<td>Computer Aided Measurement and Controls</td>
<td></td>
</tr>
<tr>
<td>MATH 265</td>
<td>4</td>
</tr>
<tr>
<td>Calculus III</td>
<td></td>
</tr>
<tr>
<td>PHYS 251</td>
<td>4</td>
</tr>
<tr>
<td>University Physics I</td>
<td></td>
</tr>
<tr>
<td>Credits</td>
<td>18</td>
</tr>
</tbody>
</table>

Second Semester

| EE 313                  | 3       |
| Linear Electric Circuits |         |
| EE 313L                 | 1       |
| Circuits Laboratory II  |         |
| ENGR 460               | 3       |
| Engineering Economy     |         |
| MATH 208               | 3       |
| Discrete Mathematics    |         |
| MATH 266               | 3       |
| Elementary Differential Equations | |
| PHYS 252               | 4       |
| University Physics II   |         |
| Credits                 | 17      |

Junior Year

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 314</td>
<td>3</td>
</tr>
<tr>
<td>Signals and Systems</td>
<td></td>
</tr>
<tr>
<td>EE 314L</td>
<td>1</td>
</tr>
<tr>
<td>Signal and Systems Laboratory</td>
<td></td>
</tr>
<tr>
<td>EE 318</td>
<td>3</td>
</tr>
<tr>
<td>Engineering Data Analysis</td>
<td></td>
</tr>
<tr>
<td>EE 316</td>
<td>3</td>
</tr>
<tr>
<td>Electric and Magnetic Fields</td>
<td></td>
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<tr>
<td>EE 321</td>
<td>3</td>
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<tr>
<td>Electronics I</td>
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<tr>
<td>EE 321L</td>
<td>1</td>
</tr>
<tr>
<td>Electronics Laboratory I</td>
<td></td>
</tr>
<tr>
<td>EE 451</td>
<td>3</td>
</tr>
<tr>
<td>Computer Hardware Organization</td>
<td></td>
</tr>
<tr>
<td>Credits</td>
<td>17</td>
</tr>
</tbody>
</table>

Second Semester

| EE 405                  | 3       |
| Control Systems I       |         |
| EE 405L                 | 1       |
| Control Systems Laboratory |     |

Senior Year

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 480</td>
<td>3</td>
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<tr>
<td>Senior Design I</td>
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<tr>
<td>Electrical Engineering Elective</td>
<td>6</td>
</tr>
<tr>
<td>MATH 207</td>
<td>2</td>
</tr>
<tr>
<td>Introduction to Linear Algebra</td>
<td></td>
</tr>
<tr>
<td>Social Sciences Elective (SS)</td>
<td>3</td>
</tr>
<tr>
<td>Credits</td>
<td>14</td>
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</tbody>
</table>

Second Semester

| EE 481                  | 3       |
| Senior Design II        |         |
| Electrical Engineering Elective | 6 |
| Ethics Elective (A&H or SS) | 3   |
| A&H or SS Elective      |         |
| Credits                 | 12      |

Total Credits: 129

1. May be waived for transfer students (substitute science credit required).
2. To meet the University’s Essential Studies Breadth of Knowledge requirements, all students must complete 9 credits of Arts & Humanities Electives (minimum of 2 departments, including 3 Fine Arts credits and 3 Humanities credits) and 9 credits of Social Sciences Electives (minimum of 2 departments). Refer to the online Academic Catalog for a listing of acceptable Essential Studies courses.
3. To meet the University’s Essential Studies Social-Cultural Diversity requirements, all students must complete 3 credits of Global (G) Diversity Electives and 3 credits of United States (U) Diversity Electives. Refer to the online Academic Catalog for a listing of acceptable Essential Studies G and U Diversity Electives.
4. EE 480 Senior Design I, meets the Essential Studies Special Emphasis requirements for Advanced Communication (A) and Senior Capstone (C). EE 480 Prerequisites: EE 421 and EE 421L and two out of the four following classes: EE 401, EE 405, EE 409, EE 452.
5. EE 481 Senior Design II, meets the Essential Studies Special Emphasis requirement for Oral Communication (O)
6. Maximum of three credits of EE 490 Electrical Engineering Problems, allowed as an independent study, applicable to both EE and non-EE Electives. 2 credits of EE 397 Cooperative Education (40 hours/week) is equivalent to 3 credits of the EE Electives with S/U grading, maximum 4 credits of EE 397 is equivalent to maximum of 6 credits of EE Elective.
7. The Ethics Elective is a 3-credit course that meets Essential Studies requirements in either the Arts & Humanities or the Social Sciences. Ethics Elective choices: Phil 120 Introduction to Ethics (Humanities); and ME 370 Engineering Disasters and Ethics (SS).
8. Computer Science Elective choices: Any Computer Science course, 300 level or higher. A maximum of three credits of CSCI 260 Advanced Programming Languages, is permitted.

III. Grade of "C" or better in all EE major courses is required for graduation.

Minor in Aviation - Professional Flight

Required: 8 Aviation credit hours from the B.S.E.E. Aerospace Focus Program, choose Avit 324 and Avit 325 for 5 credit hours of Aviation Elective, plus the following 17 additional credits (total of 30 credit hours):

| ATSC 110 | Meteorology I | 3 |
| ATSC 110L | Meteorology Laboratory | 1 |
| ATSC 231 | Aviation Meteorology | 4 |
| AVIT 208 | Aviation Safety | 3 |
Minor in Biomedical Engineering

Open to Electrical Engineering majors only.

For the B.S.E.E. Biomedical Engineering (BME) minor, the following courses need to be completed in addition to major B.S.E.E. courses:

- **BIOL 150** General Biology I 3
- **BIOL 150L** General Biology I Laboratory 1
- **BIOL 151** General Biology II 3
- **BIOL 151L** General Biology II Laboratory 1
- **ANAT 204** Anatomy for Paramedical Personnel 3
- **PPT 301** Human Physiology 4
- **PHIL 251** Ethics in Health Care 3

One of these two courses (accepted as Social Science Elective): 3
- **PSYC 111** Introduction to Psychology
- **SOC 110** Introduction to Sociology

Two of the three courses (accepted as Electrical Engineering or Technical Electives): 6
- **EE 490** Electrical Engineering Problems
- **EE 545** Introduction to Biomedical Engineering
- **EE 550** Biomedical Instrumentation

**Total Credits**: 17

---

Minor in Electrical Engineering

- **EE 201** Introduction to Digital Electronics 2
- **EE 201L** Digital Electronics Laboratory 1
- **EE 206** Circuit Analysis 3
- **EE 206L** Circuits Laboratory I 1
- **EE 313** Linear Electric Circuits 3
- **EE 313L** Circuits Laboratory II 1
- **EE 314** Signals and Systems 3
- **EE 321** Electronics I 3
- **EE 321L** Electronics Laboratory I 1

One of the two courses 3
- **EE 304** Computer Aided Measurement and Controls
- **EE 421** Electronics II

**Total Credits**: 27

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Engineering (Engr)

Minor in Engineering Science (p. 97)

**Courses**

**ENGR 100. Introduction to Engineering. 1 Credit.**

This course has been developed to provide undecided freshman in engineering with an introduction to the different engineering disciplines offered at the College of Engineering and Mines. The goal of this course is to enable undecided freshmen to make a more informed choice when choosing an engineering degree program. The course covers challenges and opportunities for emerging engineers. The overview is followed by discipline specific presentations and activities. Information about advising, career planning and placement, and information on student organizations will also be presented. S/U grading. F.

**ENGR 102. Professional Assessment and Evaluation. 1 Credit.**

This course is designed for students with industrial experience. Students complete a portfolio documenting educational and work experiences for evaluation, and individualized curriculum plans are developed. Various academic programs in engineering are also introduced. Based on the assessment and evaluation, some engineering requirements may be waived. Prerequisites: Work experience and/or technician school training plus completion of Chemistry I, Physics I and II, and Calculus I, II, and III (see dept for approval). S/U grading.

**ENGR 200. Computer Applications in Engineering. 2 Credits.**

The fundamentals of digital computer programming are presented with special emphasis on a high-level language and engineering applications. The fundamentals of PC-based software applications and operating systems are also presented. Prerequisite: CEM major or permission of instructor. F,S,SS.

**ENGR 201. Statics. 3 Credits.**

Vector approach to the principles of Statics. Analysis of resultants and equilibrium in 2-D and 3-D force systems: free body diagrams, analysis of equilibrium at a point, rigid bodies, trusses, frames and machines; shear and bending moments in beams, friction, wedges, screws, belts, pulleys and bearings, centroids and center of mass, area and mass moments of inertia. Prerequisites: CEM major or permission of instructor; MATH 165 with a grade of C or better. F,S,SS.

**ENGR 202. Dynamics. 3 Credits.**

Plane motion particle and rigid body kinematics/kinetics: Vector approach to the principles of dynamics, curvilinear coordinate systems, Newton’s laws of motion, work-energy, and impulse-momentum for particles, systems of particles, elastic collisions. Kinetics and kinematics rigid bodies and mechanical systems, work energy and impulse momentum, and vibrations. Prerequisites: CEM major or permission of instructor, ENGR 201, MATH 166, and PHYS 251 with a grade of C or better. F,S,SS.

**ENGR 203. Mechanics of Materials. 3 Credits.**

Plane stress, plane strain, stress-strain and deflection-deformation relationships: elements of material behavior, mechanical and thermal properties of materials, axial loading, torsion, shear and bending moments, flexure and shear stresses and deflection in beams, combined loading, stress and strain transformation and measurement, generalized Hooke’s Law, stress concentrations and factors of safety, statically determinate loading and column analysis. Prerequisites: CEM major or permission of instructor. ENGR 201, MATH 166, and PHYS 251 with a grade of C or better. F,S,SS.

**ENGR 206. Fundamentals of Electrical Engineering. 3 Credits.**

The course introduces fundamental electrical engineering concepts, such as passive and active components (resistor, capacitor, inductor, operational amplifier, digital gates), circuit analysis (Ohm’s Law, KCL, KVL, phasors), energy, power and three-phase systems. The course includes laboratory experiments and computer simulations. Prerequisite: CEM major (except for EE) or permission of instructor; MATH 165. F,S,SS.

**ENGR 301. Technology and Innovation Case Studies. 3 Credits.**

The qualities and attributes that lead to the successful development of new and innovative technologies will be presented in the form of case studies. This course will provide a basic understanding of the entrepreneurial process of innovation and technology-based venture creation. Effective leadership and entrepreneurial skills will be demonstrated. F.

**ENGR 340. Professional Integrity in Engineering. 3 Credits.**

This course emphasizes the need for technical professionals to develop personal integrity and moral character in order to benefit society. Students will develop an appreciation for the global context of their decisions, the ability to make sound ethical decisions, and communicate their ideas effectively. This course also explores the impact of engineering and applied science on society. Prerequisites: CEM majors and junior standing or permission of instructor. F,S,SS.

**ENGR 401. Engineering Leadership Seminar. 1 Credit.**

This seminar course is taken by students participating in the CEM Leadership Development Program. Students will meet 4-6 times per semester to take part in workshops and activities conducted by the Jodsaas Center for Engineering Leadership and Entrepreneurship staff and invited speakers from industry. Topics will include leadership, management, business and entrepreneurship presented in an engineering context. Repeatable to 4 credits. F,S.
ENGR 410. Technology Ventures. 1-3 Credits.
The primary focus will be on developing techniques to formulate the strategic framework required to develop high-tech ventures. Successful techniques to take technology-intensive opportunities from concept to commercialization will be explored. Prerequisite: Permission of instructor. Repeatable to 6 credits. S.

ENGR 460. Engineering Economy. 3 Credits.
Simple evaluation of the economic merits of alternative solutions to engineering problems. Evaluations emphasize the time value of money. Prerequisite: CEM major or permission of instructor. F,S,SS.

ENGR 490. Topics in Engineering. 1-3 Credits.
This course covers current engineering topics based on student and faculty interest. Student should check with their home department to determine whether it can be used to satisfy specific degree requirements. Prerequisite: Permission of instructor. Repeatable to 9 credits. On demand.

**Minor in Engineering Science**

The Engineering Science minor is available to non-engineering students, and requires the completion of 20 credit hours of approved coursework, as detailed below with a cumulative GPA of 2.0 or above.

<table>
<thead>
<tr>
<th>Required Courses</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGR 201 Statics</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 202 Dynamics</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 203 Mechanics of Materials</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 206 Fundamentals of Electrical Engineering</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Electives Courses</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>8</td>
</tr>
</tbody>
</table>

Total Credits 20

* The appropriate Mathematics and other pre-requisites must be met.

** Any regularly offered course at the 200 or higher level with the prefix Engr, ChE, CE, EE, GE, ME, or PTRE, may be used as an elective.

**English Language and Literature (Engl)**

B.A. with a Major in English (p. 98)

Minor in English (p. 100)

Certificate in Writing and Editing (p. 99)

**Courses**

ENGL 100. Individualized Instruction in College Composition. 1 Credit.
(Not Degree Countable). Supplemental, individualized writing support for students enrolled in English 110. Prerequisite: An ACT English score of 14-17 or an SAT Writing score of 360-420 or a COMPASS Writing Skills score of 76 or below or a ACCUPLACER WritePlacer score of 4 or below; ENGL 110 is the corequisite. F,S.

ENGL 110. College Composition I. 3 Credits.
Immersion in college-level critical reading and expository writing, emphasizing revision and careful preparation of manuscripts. The credit from this course will not count toward an English major or minor. F,S.

ENGL 130. Composition II: Writing for Public Audiences. 3 Credits.
Continues the work of College Composition I with an emphasis on rhetoric and critical thinking. Requires the writing and production of both primary and secondary research, while asking students to apply that research to larger community issues. Students will practice writing with an immediate and explicit public purpose. Prerequisite: ENGL 110. F,S.

ENGL 209. Introduction to Linguistics. 3 Credits.
An introduction to the nature of language, phonology, grammar, semantics, and historical, geographical, social, and developmental aspects of language. F,S.

ENGL 225. Introduction to Film. 3 Credits.
The study of film drama, concentrating on appreciation and evaluation of motion pictures. F,S.

ENGL 226. Introduction to Creative Writing. 3 Credits.
An introduction to the types and basic principles of creative writing, taught through a combination of class discussion and practice-writing. F,S.

ENGL 227. Introduction to Literature and Culture. 3 Credits.
A course with alternating topics that asks students to read literary texts of a variety of genres. The course may emphasize form and texts from various historical periods as it introduces students to the pleasures of analyzing text and culture. Repeatable when topics vary. Repeatable. F,S.

ENGL 228. Diversity in Global Literatures. 3 Credits.
This course will explore global literatures with a special emphasis on concepts like culture, difference, and diversity. The course will analyze global literature in cultural and historical contexts, and will emphasize the complex ways that literature is influenced by issues of social power (especially those that affect significant categories through which social inequalities are negotiated—such as gender, race, class, and sexual orientation). Repeatable when topics vary. Repeatable to 9 credits. F,S.

ENGL 234. Introduction to Writing, Editing, and Publishing. 3 Credits.
An overview of editing as a career and of publishing as a process from the perspective of both the editor and the writer. Explores job opportunities in the field, and helps students develop an introductory skills set for gaining those jobs. F,S.

ENGL 235. The Art of Filmmaking. 3 Credits.
This is a hands-on workshop-oriented course where students practice the art of filmmaking. The course may include screenwriting and/or film production. Repeatable. F,S.

ENGL 241. World Literature I. 3 Credits.
Great literature of western Europe, or in the European tradition, studied with emphasis upon intellectual and cultural values. F.

ENGL 242. World Literature II. 3 Credits.
Great literature of western Europe, or in the European tradition, studied with emphasis upon intellectual and cultural values. S.

ENGL 271. Reading and Writing about Texts. 3 Credits.
A writing-intensive introduction to English Studies offering practice in the conventions of analyzing texts and of writing literary analysis. Required of English majors. F,S.

ENGL 272. Introduction to Literary Criticism. 3 Credits.
A writing-intensive course that introduces students to various schools of literary criticism. Required of English majors. F,S.

ENGL 299. Special Topics. 1-4 Credits.
A course for undergraduate students, on topics varying from term to term. Repeatable when topics vary. Repeatable to 40 credits. F,S.

ENGL 301. Survey of English Literature I. 3 Credits.
English literature from its beginnings to the twenty-first century. F.

ENGL 302. Survey of English Literature II. 3 Credits.
English literature from its beginnings to the twenty-first century. S.

ENGL 303. Survey of American Literature. 3 Credits.
The literature of the United States from its beginnings to the twenty-first century. F.

ENGL 304. Survey of American Literature. 3 Credits.
The literature of the United States from its beginnings to the twenty-first century. S.

ENGL 306. Creative Writing: Fiction. 3 Credits.
Intermediate-level study and practice of fiction-writing. Prerequisite: ENGL 226 or instructor’s permission. F,S.

ENGL 308. The Art of Writing Nonfiction. 3 Credits.
Advanced writing. Emphasis on rhetorical effectiveness and style. Prerequisite: ENGL 120 or ENGL 125 or ENGL 130. F,S.

ENGL 309. Modern Grammar. 3 Credits.
Various approaches to the structure of modern English, with emphasis on dialect variation and applications to the problems of teaching. F.
ENGL 315. Shakespeare. 3 Credits.
The study of Shakespeare’s works. F.
ENGL 323. Studies in Literary Genre. 3 Credits.
Genre-specific study of literature. Repeatable if topics vary. Repeatable to 12 credits. On demand.
ENGL 334. Practicum in Writing, Editing, and Publishing. 3 Credits.
Intensive practice in preparing materials for publication in a variety of media. Prerequisite: ENGL 234 or permission of instructor. Repeatable to 6 credits. F,S.
ENGL 357. Women Writers and Readers. 3 Credits.
Literature by and about women, examining the social, historical, and aesthetic significance of the works. Repeatable when topics vary. Repeatable to 21 credits. F,S.
ENGL 359. Young Adult Literature. 3 Credits.
The study of literature for and about young adults (from the middle school through the high school years), examining the social, historical, and aesthetic significance of the works. S.
ENGL 365. Black American Writers. 3 Credits.
Writing by Black Americans studied for understanding and critical appreciation. S.
ENGL 367. American Indian Literatures. 3 Credits.
A study of historical and contemporary literature by American Indians. S.
ENGL 369. Literature and Culture. 3 Credits.
The study of literature in its cultural context. Repeatable when topics vary. Repeatable. F,S.
ENGL 370. Language and Culture. 3 Credits.
Interaction of language with other cultural subsystems. (Same course as Anthropology 370.). Prerequisite: ENGL 209. S.
ENGL 372. Literary Theory. 3 Credits.
An exploration of particular writers of, approaches to, or debates within literary theory and criticism. Topic varies by semester. Repeatable. Repeatable. F,S.
ENGL 397. Cooperative Education. 1-8 Credits.
A course designed to offer English majors work experience related to their disciplinary training in close reading, careful writing, and interpretative analysis. Repeatable to 15 credits. Prerequisites: 15 credits completed in English, overall GPA of 2.5, English GPA of 2.75, and department approval. Repeatable to 15 credits. S/U grading. F,S,SS.
ENGL 398. Independent Study. 1-4 Credits.
Supervised independent study. Only 6 hours may apply to the 36-hour English major. Prerequisites: English majors only and written consent of the department. Repeatable to 40 credits. F,S.
ENGL 399. Honors Tutorial. 2-4 Credits.
ENGL 408. Writing for Digital Environments. 3 Credits.
Advanced writing in and for digital platforms. Prerequisite: ENGL 120 or ENGL 125 or ENGL 130. On demand.
ENGL 409. Art of the Cinematic Drama. 3 Credits.
An investigation of the aesthetics of the film drama with a concentration on the theory and evaluation of the medium. This course examines the relationship of the verbal and visual arts. Repeatable when topics vary. Prerequisite: ENGL 225. Repeatable. S.
ENGL 410. Studies in Literary Periods. 3 Credits.
Period-specific study of literature. Repeatable if topics vary. Repeatable to 12 credits. On demand.
ENGL 413. The Art of Writing: Poetry. 3 Credits.
Intermediate and advanced-level study and practice of poetry-writing. Repeatable once. Prerequisite: ENGL 226 or instructor’s permission. Repeatable to 6 credits. F.
ENGL 414. The Art of Writing: Fiction. 3 Credits.
Continues the work of ENGL 306, Creative Writing: Fiction, at the advanced level. Prerequisite: ENGL 306 or instructor’s permission. Repeatable to 6 credits. S.
ENGL 415. Seminar in Literature. 1-4 Credits.
A course for advanced students on topics varying from year to year. Repeatable. Repeatable. S.

ENGL 418. Second Language Acquisition. 3 Credits.
This course focuses on recent second language acquisition (SLA) research findings from the areas of linguistics, psychology, education, and communication and on how to relate these findings to language learning and teaching. Prerequisite: ENGL 209. S.
ENGL 419. Teaching English as a Second Language. 3 Credits.
An introduction to the principles of teaching English as a second language, with special attention to tutoring. Prerequisite: ENGL 209. F.
ENGL 423. Methods/Materials for Teaching Middle/Secondary English. 3 Credits.
Various teaching methods, strategies, and materials used in teaching middle and secondary school English. For English education majors only. Prerequisites: T&L 250 and T&L 345. Corequisite: T&L 486. F.
ENGL 428. Digital Humanities. 3 Credits.
Examines the growing necessity for digital products in the humanities and moves the concept of publishing from hard copy to electronic copy. Students will have hands-on opportunities to create new knowledge by working on projects across campus such as digitizing materials in the library’s special collections department and working directly with professors’ research initiatives. F, even years.
ENGL 442. History of the English Language. 3 Credits.
The development of the language from the earliest times to the present. This course is recommended for all prospective English teachers. S.
ENGL 489. Senior Honors Thesis. 1-8 Credits.
Supervised independent study culminating in a thesis. Repeatable to 9 credits. Prerequisites: Consent of the Department and approval of the Honors Committee. Repeatable to 9 credits. F,S.
ENGL 95. Introduction to Academic Writing. 3 Credits.
Not Degree Countable. A course which helps students practice the academic writing skills that they will continue to develop in English 110. Course includes instruction in the reading of academic arguments, the process of revision, and the conventions associated with integrating sources into written work. Prerequisite: An ACT English score of 13 or below or an SAT writing score of 350 or below or department approval. F.

Bachelor of Arts with Major in English

Required 120 credits (36 of which must be numbered 300 or above, and 30 of which must be from UND) including:

I. Essential Studies Requirements (see University ES listing).

II. The Following Curriculum:

Major Requirements—36 credits, 20 of which must be at the 300- or 400-level. The following courses are required:

ENGL 271 Reading and Writing about Texts 3
ENGL 272 Introduction to Literary Criticism 3
Select one of the following: 6
ENGL 301 Survey of English Literature I
& ENGL 302 Survey of English Literature II
ENGL 303 Survey of American Literature
& ENGL 304 Survey of American Literature
Select one of the following: 3
ENGL 241 World Literature I
ENGL 301 Survey of English Literature I (in addition to 303-304)
ENGL 303 Survey of American Literature (in addition to 301-302)
ENGL 315 Shakespeare
ENGL 410 Studies in Literary Periods (when topic is appropriate; consult your adviser)
ENGL 415 Seminar in Literature (when topic is appropriate; consult your adviser)

Select two 400-level courses, one of which must be ENGL 415

Level II (two semesters) proficiency in a language other than English.
Middle School licensure, 6 hours of developmental reading are required, developmental reading (semesters) in a foreign language, 3 hours of speech, and 3 hours of I. The English major (described above), including level-II proficiency (two licensure in English. The following program of study must be completed:

Through a partnership with the College of Education and Human Development, students may seek secondary Teacher Licensure

Scenario One: You are interested in writing and publishing. Include courses from this list:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 226</td>
<td>Introduction to Creative Writing</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 306</td>
<td>Creative Writing: Fiction</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 308</td>
<td>The Art of Writing Nonfiction</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 408</td>
<td>Writing for Digital Environments</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 413</td>
<td>The Art of Writing: Poetry</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 414</td>
<td>The Art of Writing: Fiction</td>
<td>3</td>
</tr>
</tbody>
</table>

You may also consider pursuing a Certificate in Writing and Editing or taking any of the courses included in the Certificate:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 234</td>
<td>Introduction to Writing, Editing, and Publishing</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 334</td>
<td>Practicum in Writing, Editing, and Publishing</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 408</td>
<td>Writing for Digital Environments</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 428</td>
<td>Digital Humanities</td>
<td>3</td>
</tr>
</tbody>
</table>

Scenario Two: You would like to focus on linguistics (the study of language, including teaching English as a second language, computer languages, translation, etc.) Include courses from this list:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 209</td>
<td>Introduction to Linguistics</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 309</td>
<td>Modern Grammar</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 370</td>
<td>Language and Culture</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 418</td>
<td>Second Language Acquisition</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 419</td>
<td>Teaching English as a Second Language</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 442</td>
<td>History of the English Language</td>
<td>3</td>
</tr>
</tbody>
</table>

Note: Related language and linguistics courses are taught in the summer through the Summer Institute of Linguistics. A maximum of 10 credits of these courses may be applied to the English major. Students considering graduate work in language and linguistics are urged to study more than one foreign language.

Scenario Three: You are considering attending graduate school in English, in another discipline, or law school. Include courses from this list:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 372</td>
<td>Literary Theory (topics rotate and may be repeated different topics)</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 410</td>
<td>Studies in Literary Periods (Advanced study in particular genres or periods (topics rotate and may be repeated with different topics)</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 415</td>
<td>Seminar in Literature (topics rotate and may be repeated with different topics)</td>
<td>3</td>
</tr>
</tbody>
</table>

Teacher Licensure

Through a partnership with the College of Education and Human Development, and the Department of Teaching and Learning, students may seek secondary licensure in English. The following program of study must be completed:

I. The English major (described above), including level-II proficiency (two semesters) in a foreign language, 2 hours of speech, and 3 hours of developmental reading (T&L 416 Adolescent Literacy Development). (For Middle School licensure, 6 hours of developmental reading are required, including T&L 409 Reading in the Content Areas.) ENGL 423 Methods/Materials for Teaching Middle/Secondary English does not count toward the 36-hour English major.

Students are advised to create a major in which courses that satisfy the demands of a career in secondary teaching are balanced against the broader range of courses offered by the Department.

Required in the major:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 309</td>
<td>Modern Grammar</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 359</td>
<td>Young Adult Literature</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 308</td>
<td>The Art of Writing Nonfiction</td>
<td>3</td>
</tr>
</tbody>
</table>

or ENGL 408 Writing for Digital Environments

Total Credits 24

Recommended in the major:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 209</td>
<td>Introduction to Linguistics</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 301</td>
<td>Survey of English Literature I</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 302</td>
<td>Survey of English Literature II</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 303</td>
<td>Survey of American Literature</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 304</td>
<td>Survey of American Literature</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 315</td>
<td>Shakespeare</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 357</td>
<td>Women Writers and Readers</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 365</td>
<td>Black American Writers</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 24

II. Admission to the Secondary Program, normally while taking T&L 250 Introduction to Education. (See College of Education and Human Development (https://education.und.edu) for admission and licensing requirements).

III. The Program in Secondary Education, to include:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>T&amp;L 319</td>
<td>Integrating Diverse Needs in Educational Settings</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 339</td>
<td>Educational Technology</td>
<td>2</td>
</tr>
<tr>
<td>T&amp;L 345</td>
<td>Curriculum, Instruction, and Assessment</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 350</td>
<td>Development and Education of the Adolescent</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 416</td>
<td>Adolescent Literacy Development</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 423</td>
<td>Methods/Materials for Teaching Middle/Secondary English (spring only)</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 432</td>
<td>Learning Environments</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 433</td>
<td>Multicultural Education</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 486</td>
<td>Field Experience</td>
<td>1-4</td>
</tr>
<tr>
<td>T&amp;L 487</td>
<td>Student Teaching</td>
<td>4-16</td>
</tr>
<tr>
<td>T&amp;L 488</td>
<td>Senior Seminar</td>
<td>1</td>
</tr>
</tbody>
</table>

Total Credits 29-44

* taken concurrently with ENGL 423 Methods/Materials for Teaching Middle/Secondary English; 60 hours per semester

English majors seeking secondary licensure must have an adviser in both the English Department and the Department of Teaching and Learning.

Students planning to teach in Minnesota are required to take coursework in Middle Level Education; consult Teaching & Learning advisers for more information.

IV. Optional

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>T&amp;L 386</td>
<td>Field Experience</td>
<td>1</td>
</tr>
<tr>
<td>T&amp;L 390</td>
<td>Special Topics</td>
<td>1-3</td>
</tr>
</tbody>
</table>

Total Credits 2-4

Certificate in Writing and Editing

The ability to present ideas and concepts articulately and in a professional style is highly valued by employers, no matter what the medium or context - print or
digital; business or the academy. Courses are designed with three goals for student learning:

- to introduce the role of information processing in our culture, both in print and electronic media;
- to offer hands-on experience in the production of texts in academic and commercial contexts;
- to promote the clear and concise dissemination of ideas and information.

The certificate is comprised of 18 credit hours. English courses taken for the certificate, with the exception of the required writing course, do not count towards the English major or minor. The following courses are required for the certificate:

**Required courses:**
- ENGL 234 Introduction to Writing, Editing, and Publishing 3
- ENGL 334 Practicum in Writing, Editing, and Publishing 3
- ENGL 428 Digital Humanities 3

**One of the following courses:**
- ENGL 226 Introduction to Creative Writing 3
- ENGL 308 The Art of Writing Nonfiction 3
- ENGL 408 Writing for Digital Environments 3

**Six credits from the following courses:**
- ART 273 Intro to Graphic Design 3
- COMM 206 Digital Communication: Fundamentals 3
- COMM 305 Audio Production & Broadcasting 3
- COMM 319 Digital Imaging Across Platforms 3
- COMM 345 Social Media Strategy 3
- TECH 102 Digital Design Software 3
- TECH 212 Visual Literacy 3
- TECH 232 Web Design 3

**Minor in English**

**Required:** 20 hours, including:

- ENGL 271 Reading and Writing about Texts 3
- ENGL 272 Introduction to Literary Criticism 3
- English electives, nine credits of which must be numbered 300 or above 15

**Total Credits** 21

Students seeking secondary certification in another discipline who wish to achieve a minor in English should take the following courses as part of the minor:

- ENGL 309 Modern Grammar 3
- ENGL 359 Young Adult Literature 3
- ENGL 308 The Art of Writing Nonfiction 3
  or ENGL 408 Writing for Digital Environments 3

**Total Credits** 9

**Entrepreneurship Certificate**

**ENTR 101** Introduction to Entrepreneurship 3
**ENTR 290** Entrepreneurial Opportunities and Concept Development 3
**ENTR 386** Financials for Entrepreneurs 3

**Total Credits** 9

**ENTR Courses**

**ENTR 101. Introduction to Entrepreneurship. 3 Credits.**
ENTR 101 is an introductory course structured to provide a firm basis as to the critical role entrepreneurs and entrepreneurship plays in the global economy. Entrepreneurship will be analyzed, debated, assessed, and explored experientially throughout the semester from an interdisciplinary perspective. Entrepreneurship will be viewed as a manageable process and way of thinking, acting, and behaving applicable not only to business endeavors, but to everyday problems existing in the workplace and society. F.S.

**ENTR 290. Entrepreneurial Opportunities and Concept Development. 3 Credits.**
Every successful venture, big or small, started with a problem and an idea for a solution. Venture success is a measured combination of feasibility, viability, testing, and luck. Too many entrepreneurs, unfortunately, rely strictly on luck. This course will show you how to test your business idea through customer discovery and validation; business and revenue modeling; effectuation; and the ability to communicate all of your findings to stakeholders. Whether for-profit, not-for-profit, or an internal corporate project/venture, success or failure doesn’t happen by accident. Learn the tools that give you the best chance to win. F.S.

**ENTR 316. Entrepreneur Law & Operations. 3 Credits.**
Starting your own venture? Do you know the legal hurdles you must leap? This is not a dry, legal lecture series. Learn entrepreneur law hands-on! Experience relevant legal requirements as you form a real or simulated corporation/LLC, participate in mock owner disputes, draft contracts, hire employees, assume debt, sell equity, file for bankruptcy, franchise, and a host of other exciting activities! Who knew? Law doesn’t have to be boring! F.S.

**ENTR 333. New Product Development. 3 Credits.**
The recognition, discovery and creation of new product/service opportunities is a critical component of the entrepreneurial process. From the inception of the automobile to Facebook, finding the right opportunity can help create products and organizations that can have profound impacts on industries, customers and society at large. Therefore, the goal of the course is to create a product/service development lab, to help participants explore different techniques and perspectives on finding new products/services and bringing them to market. F.

**ENTR 375. Small and Family Business. 3 Credits.**
Small business is an economic driver and contributes to new jobs and economic growth development. Family-owned businesses often outperform non-family owned businesses. This course will cover venture planning and operations in this important context, small and family businesses. Prerequisite: ENTR 101. S.

**ENTR 385. Entrepreneurial Opportunities and Concept Development. 3 Credits.**
Every successful venture, big or small, started with a problem and an idea for a solution. Venture success is a measured combination of feasibility, viability, testing, and luck. Too many entrepreneurs, unfortunately, rely strictly on luck. This course will show you how to test your business idea through customer discovery and validation; business and revenue modeling; effectuation; and the ability to communicate all of your findings to stakeholders. Whether for-profit, not-for-profit, or an internal corporate project/venture, success or failure doesn’t happen by accident. Learn the tools that give you the best chance to win. F.S.

**ENTR 386. Financials for Entrepreneurs. 3 Credits.**
This course will review key financing concepts to give entrepreneurs and aspiring entrepreneurs a guide to securing funding. Students will develop the skills necessary to complete the financial section of a business plan. Concepts that are taught include sources of capital, the economic ecosystem, core and adjacency strategies, lean startups and strategy pivots, customer value creation and switching costs, pricing models, operating costs, cash flow planning, revenue forecasts and financial projections, private and public company analysis, and franchise evaluation. At the end of the course students should be able to think critically about business and make critical strategic evaluations during the course of a business lifecycle. F.S.
ISBC Courses

ISBC 117. Personal Productivity with Information Technology. 1 Credit.
Introductory lab-based course covering basic computer hardware, operating systems, software, and Microsoft Office tools. F,S,SS.

ISBC 217. Fundamentals of Computer Information Systems. 3 Credits.
This course exposes students to the role information systems play in the business world with an introduction to information technology topics and data analytics. This experiential and application-oriented course develops spreadsheet, visualization, and database competencies relevant to business professionals. F,S,SS.

ISBC 240. Operating Systems Principles. 3 Credits.
An introduction to a variety of computer operating systems. Emphasis placed on terminology, concepts, system commands, architecture, maintenance, and troubleshooting. Hands-on experience with operating systems and operating environments such as Windows and UNIX at the workstation and server level. Prerequisite: ISBC 117. On demand.

ISBC 260. Digital Technology for Entrepreneurs. 3 Credits.
All new ventures utilize digital technology. Even the most basic enterprise is dependent upon digital technology to function efficiently and effectively. You will explore and learn some of the common digital technologies that assist with entrepreneurial thinking. We will also play with technologies that form the basis of new digital ideas, products and services. F,S.

ISBC 300. Programming for Data Analytics. 3 Credits.
This course introduces one powerful and widely used programming language for data analytics. Course content may vary based on the current programming trend. The programming language chosen has easily understood syntax and library or open source modules for everything from web development to data analysis. This course covers the syntax and semantic of the programming language and its uses as a data analytics tool. The material will emphasize the core concepts in the programming language, specifically data types, data structures, functions, and text and image processing and how they can be implemented and used to address data analytics problems. Popular modules used in data analysis such as data mining and data visualization will also be covered. F.

ISBC 305. End-User Applications. 3 Credits.
Development of proficiency in the use of end-user software applications with emphasis on spreadsheet and database. Spreadsheet applications include solutions for typical business situations using functions, macros and linking. Database applications include development of and querying of databases, linking, generating forms and reports, and developing menus. Prerequisite: ISBC 117 or ISBC 217. S.

ISBC 330. Database Management. 3 Credits.
This course covers the fundamentals of database design and management. Topics include, but not limited to, database models, database normalization, entity-relationship diagramming, SQL and database implementation and management. The course will provide a balance of theory and practical applications and will culminate in database implementation exercises conducted by students. F,S.

ISBC 340. Fundamentals of Networking. 3 Credits.
Explores principles of networking computer systems; telecommunications hardware, software, and media components; and approaches to efficient business data communications. The student will be exposed to telecommunications terminology, concepts, protocols, and logical and physical design of local area networks. S.

ISBC 350. Networking II. 3 Credits.
An in-depth study of networking protocols, planning, design, security, VLANs, switch and router configuration, workstation and server management, troubleshooting, and when possible, enterprise level network topics. Prerequisite: ISBC 340. On demand.

ISBC 370. Web Development. 3 Credits.
An introduction to web application development in a business environment. Students learn programming theory, fundamentals and practices in writing programs to meet business requirements, solve business problems, and address business opportunities in the desktop, mobile and/or Internet/intranet environments. S.

ISBC 397. Cooperative Education. 1-2 Credits.
Compensated work experience in areas related to information systems. Enrollment in 1 credit grants half-time student status, 2 credits grants full-time status (See Academic Catalog description of Cooperative Education.). Prerequisites: ISBC 217 and approval of the Information Systems Cooperative Education/Internship Coordinator. Repeatable to 6 credits. S/U grading. F,S,SS.

ISBC 400. Information Security. 3 Credits.
An introduction to information security and information assurance. The students will achieve a firm intuition about what information security means; be able to recognize potential threats to information confidentiality, integrity and availability; be aware of some of the underlying technologies that address these challenges; and be conversant with current security-related issues in the field. This course addresses both the technical and behavioral aspects of information security. Prerequisites: ISBC 330, ISBC 340, and ISBC 370. F.

ISBC 430. Database Analytics. 3 Credits.
This course equips students with an understanding of techniques in data analytics with particular emphasis on unstructured data. Coverage includes, but not limited to, database analytics, PL/SQL, advanced SQL, business intelligence, unstructured big data analytics, Hadoop framework in business, data visualization, data warehousing, NoSQL, and in-memory database system. Prerequisite or Corequisite: ISBC 330. F.

ISBC 431. Database Administration and Optimization. 3 Credits.
Focuses on the administration of business databases and the optimization of database performance at the server level. Topics may include but are not limited to user and security administration, physical organization and optimization, performance maintenance and monitoring, fault tolerance, database distribution and replication. Prerequisite: ISBC 430. On demand.

ISBC 444. Philosophy of Vocational Education. 3 Credits.

ISBC 451. Networking II. 3 Credits.
Focuses on exploring a variety of advanced networking topics. Students will develop knowledge and practical skills including, but not limited to, advanced configuration, implementation, security, and troubleshooting of network servers, services, devices, resources, and infrastructure. Prerequisite: ISBC 350. On demand.
TECH 102. Digital Design Software. 3 Credits.
Learn to use industry-standard software to explore the principles of graphic design. You learn the principles of design production and develop the ability to communicate effectively in a visual format. F.

TECH 110. Fundamentals of Technology. 2 Credits.
The study of the philosophy and objectives of technology with emphasis on the theories, principles, and concepts of manufacturing, design, and electronics. F.

TECH 122. Computer-Aided Design. 3 Credits.
You are introduced to computer-aided design/drafting using AutoCAD software and technical drawing techniques to include blueprint interpretation, various projections, pictorials, dimensioning, developments and tolerancing. Hands-on exercises and drawing problems are reflective of industry and business. S.

TECH 200. Energy Fundamentals. 3 Credits.
The objective of the Energy Fundamentals course is to provide students with the fundamental knowledge to understand, and qualitatively and quantitatively calculate how energy is converted from basic energy sources such as fossil fuels, biomass, solar energy and wind to electrical energy. F.

TECH 201. Electromechanical Fundamentals. 4 Credits.
The study of the fundamental properties of mechanical, hydraulic, and electronic/electrical systems (primarily those that revolve around Direct Current (DC) including an introduction to Programmable Logic Controllers (PLCs)). Experiential learning is facilitated through the use of project design and development. Prerequisite: MATH 103. Corequisite: PHYS 161 or equivalent. F.

TECH 202. Advanced Application of CADD Techniques. 3 Credits.
The advanced study of computer aided design/drafting to include 3D coordinates and layout, subsurface meshes, regions, solid modeling, and connection to computer numerical control (CNC). The creation of presentation graphics using bitmap files, shading, and rendering is also presented. Prerequisite: TECH 122 or consent of instructor. S.

TECH 203. Production Processes & Material Testing. 4 Credits.
This course provides students with an understanding of manufacturing processes and the strong interrelationships between manufacturing processes, product design, and material properties. Emphasis is placed on standard manufacturing processes such as casting, heat treatment, forging, turning, and milling. Additional topics covered will include material testing and inspection, and the interpreting technical drawings. S.

TECH 204. Industrial Materials. 4 Credits.
The theoretical and laboratory study of the physical and chemical attributes of organic and inorganic materials for conversion into industrial materials are explored. Source, structure, characteristics, properties, and practical applications of metallic, polymer, wood, ceramic, and composite materials are introduced. Laboratory activities are designed to explore the attributes of these materials as well as to practice the material testing processes. F.

TECH 211. Electric Circuits and Devices. 4 Credits.
The subject matter covered in this course will include concepts, principles, and operational characteristics of electronic/electrical components with a focus on Alternating Current (AC), discrete and integrated devices including computer driven electronic control systems. Design and developmental activities are facilitated through the use of simulation-Multisim software-and Ultraboard, a Printed Circuit Board (PCB) design and development software. Prerequisite: TECH 201, MATH 103 and MATH 105. S.

TECH 212. Visual Literacy. 3 Credits.
This course introduces the basic concepts of graphic design and visual communication. You sharpen brainstorming and problem-solving skills via design principles, color theory, and typography as they sharpen brainstorming and problem-solving skills. Prerequisite: TECH 102. S.

TECH 213. Wood Products Manufacturing. 3 Credits.
An introductory study of wood manufacturing methods and techniques utilizing tools and machines leading to the production of constructed assemblies. Prerequisite: TECH 110 or TECH 204 or consent of instructor. F, even years.

TECH 223. Applied Synthetics. 3 Credits.
A study of synthetic/polymer materials emphasizing identification of characteristics and properties; and their application as related to industrial products. Prerequisites: CHEM 115/115L or 121/121L. F, odd years.

TECH 230. User Experience and Interface Design. 3 Credits.
Have you ever felt frustrated using a website or digital interface that didn't function properly? This course introduces you to the common ways in which humans interact with digital interfaces. Through study of user experience principles, you will design digital interfaces that are easy to use. F.

TECH 232. Web Design. 3 Credits.
Learn how to design for the web using HTML and CSS. This class provides you with the principles and tools to create modern, aesthetically pleasing websites that are easy to navigate. S.

TECH 270. Design Thinking. 3 Credits.
Ever had a problem you didn't have any idea how to solve? Design thinking is actually a problem solving process you can learn! You will learn to approach highly unstructured problems and to create opportunities of them. Design thinking is an important entrepreneurial skill, but it is an equally important life skill. Design thinking is empowering—and a lot of fun. F.S.

TECH 300. Technology and Society. 3 Credits.
A lecture-recitation course emphasizing the various impacts of technology on the individual, society, environment and basic institutions. Technological matrix of various cultures. F.S.

TECH 311. Computers and Emerging Technologies. 3 Credits.
An introductory course to the personal computer with an emphasis on system hardware, boot-up sequence, configuration and customization, operating systems, upgrading, and troubleshooting. The course will also examine emerging computer technologies, various peripheral devices and interfaces, including network and computer wireless communications systems. F.

TECH 322. Digital Photography Fundamentals. 3 Credits.
Taking good pictures is more than point and click! This course is introduces the basic aesthetic and technical theories and techniques of digital photography. A digital camera with aperture priority, shutter priority, manual, and exposure compensation is required. F.

TECH 330. Quality Assurance. 3 Credits.
The study of principles and techniques of quality assurance and quality management, with an emphasis on the fundamentals of quality assurance for products, product control, and process capability. Related topics include quality design review, fundamentals of statistics, sampling and control chart systems, quality reporting, process capability analysis, tool and gauge control, document control, and troubleshooting quality control. Prerequisite: ECON 210 or consent of instructor. S, odd years.

TECH 332. Industrial Design. 3 Credits.
In this industrial design course students will learn how to design products in support of human activities and interactions. Principles and techniques of needs assessment, patent research, concept realization, design alternatives, and prototype development will be introduced through a creative and inventive process to address various instrumental factors such as product aesthetics, functionality, materials, sustainability, and usability. Prerequisite: TECH 122 or consent of instructor. F.
TECH 340. Cost Estimating. 3 Credits.
Principles and techniques necessary for the economic analysis and evaluation of industrial design projects. Prerequisites: ECON 210, MATH 146, or equivalent, or consent of instructor. S. even years.

TECH 341. Digital Integrated Circuits. 3 Credits.
The study of basic concepts of digital circuits and devices; operational characteristics of digital integrated circuits. Prerequisite: TECH 211 or consent of instructor. S. odd years.

TECH 373. Advanced Manufacturing Processes. 3 Credits.
This advanced course in manufacturing covers both the theory and practice of advanced manufacturing. The course will focus on advanced machines and processes that are used to a significant degree in modern manufacturing facilities including conventional CNC machines and also non-traditional processes such as additive manufacturing. Students will demonstrate their knowledge of these processes through a series of lectures, discussions, and laboratory activities with the resultant knowledge necessary to apply these principles and processes to appropriate applications. Prerequisites: TECH 122 and TECH 203, or equivalent. S.

TECH 396. Field Experiences in Technology. 1-6 Credits.
Provides students with supervised opportunities to engage in various technical industrial or business experiences by working with and learning from practicing professionals. Repeatable to 6 credits. Prerequisite: Junior standing or consent of instructor. Repeatable to 6 credits. F.S.S.

TECH 397. Cooperative Education. 1-6 Credits.
a practical work experience with an approved company in business or industry, arranged by the student, faculty and employer. Repeatable to 6 credits. Prerequisites: junior standing, GPA of 2.5 overall, and faculty approval. Repeatable to 6 credits. S/U grading. F.S.S.

TECH 399. Honors Tutorial. 1-3 Credits.

TECH 400. Teaching Technology Education. 3 Credits.
An analysis of various methods employed in instructional techniques for industry and education. Development of methods and strategies of instruction use and ordering of instructional materials, based on behavioral objectives and classroom application of instructional techniques; lab activities. Prerequisites: Junior standing and consent of instructor. F. odd years.

TECH 403. Product Research and Development. 3 Credits.
The study of product development and production planning for manufacture through the application of research methodologies, design processes, and prototype development. Prerequisite: TECH 203 or consent of instructor. F.

TECH 420. Facilities Design. 3 Credits.
Principles and applications of designing industrial/business facilities with emphasis on site location, environmental consideration, qualitative and quantitative modeling. Computer application in facility planning and quantitative analysis; lab activities. Prerequisites: TECH 122. S.

TECH 422. Advanced Digital Photography and Imaging. 3 Credits.
Through specialized shooting techniques, this course builds upon the fundamentals learned in TECH 322 to expand your knowledge and abilities. You will explore several theme-based photographic topics that will challenge you visually and intellectually. Then you create a portfolio of unique photographs to tie these topics together into one theme. A digital camera with aperture priority, shutter priority, manual, and exposure compensation is required. Prerequisite: TECH 322 or consent of instructor. S.

TECH 433. Manufacturing Strategies. 3 Credits.
Theoretical and laboratory study of strategies utilized by business and industry to develop and maintain a competitive edge. Topics include lean manufacturing, Kanban, five S's, Kaizen, push and pull modeling, fishbone-4Ms, line balancing, and PoKayoke. Prerequisites: TECH 122 and TECH 203. F.

TECH 440. Occupational Safety. 3 Credits.
The major safety concerns and problems commonly associated with the industrial and occupational environment are addressed. Emphasis is placed on the study of safety rules and regulations, implementation of management tools to benefit people for optimum safety conditions and productivity, and the documentation required for record keeping. Prerequisite: Upper division students only. S.

TECH 442. Industrial/Applied Graphic Design. 3 Credits.
We explore the concepts of branding, info-graphics and various avenues of processing and translating information in a visual format. Emphasis is placed on the relationship between text and image through a series of design-based problems. The visual and conceptual aspects of branding focuses on the development of practical, multi-component design solutions including logo design and other business communication applications. Understanding and ordering complex data into useful and persuasive informational tools takes form via info-graphics, visual processes and procedures. Emphasis is placed on the use of formal design principles, creative brainstorming, conceptualizing, critical thinking, collaboration, and presentation. Prerequisites: TECH 212. S.

TECH 450. Packaging Design. 3 Credits.
This course introduces you to the unique challenges of packaging design. Through prototypes and finished products, you develop solutions to 3D design problems that will delight the user. Special emphasis is placed on social, sustainable, and environmental issues in the packaging industry. Prerequisite: TECH 122. F.

TECH 451. Computer Integrated Manufacturing. 3 Credits.
A study of computer integrated systems and their designs to facilitate the manufacture and production processes. Topics covered the application and integration of Programmable Logic Controllers (PLCs), microcontrollers, touch-screen, TCP/IP, and voice control systems to facilitate manufacturing processes. Students will also utilize commercial computer-aided design tools, i.e., Multisim and Ultiboard to design, simulate, and test designed manufactured systems. Prerequisites: TECH 201 and TECH 211. F.

TECH 452. Multimedia Production. 3 Credits.
This advanced graphics course is designed to explore multimedia production technologies, concepts, processes, methods, and techniques. The course provides hands-on experience applying multimedia technology to integrate graphics, text, sound and video into meaningful productions. On demand.

TECH 493. Workshop. 1-6 Credits.
A workshop course on a specific topic, primarily for, but not confined to, Continuing Education. Repeatable to 24 credits. Repeatable to 24 credits. F.S.S.

TECH 497. Directed Studies in Technology. 1-8 Credits.
Studies in topics relevant to the students’ needs in selected topics including, but not limited to, Graphics, Electronics, Production, and Technology Education. Prerequisites: Junior Standing and instructor consent. Repeatable to 8 credits. F.S.S.

TECH 498. Senior Capstone I. 1 Credit.
Prerequisites: Senior Standing and consent of instructor. F.

TECH 499. Senior Capstone II. 3 Credits.
The capstone course is designed to integrate and reflect on coursework covered throughout the student’s program in order to demonstrate knowledge, understanding and competency related to the program goals. The course also facilitates students’ transition from the academic to the professional world. Prerequisites: TECH 498, senior standing and consent of instructor. S.

Bachelor of Business Administration with Major in Entrepreneurship
Required 120 credit hours (36 of which must be numbered 300 or above) including:

I. Essential Studies Requirements (see University ES listing).

II. One of the following: MATH 103, MATH 146, or MATH 165

III. College of Business and Public Administration Requirements:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 200</td>
<td>Elements of Accounting I</td>
<td>3</td>
</tr>
<tr>
<td>ACCT 201</td>
<td>Elements of Accounting II</td>
<td>3</td>
</tr>
<tr>
<td>ECON 201</td>
<td>Principles of Microeconomics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 202</td>
<td>Principles of Macroeconomics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 210</td>
<td>Introduction to Business and Economic Statistics</td>
<td>3</td>
</tr>
<tr>
<td>ISBC 217</td>
<td>Fundamentals of Computer Information Systems</td>
<td>3</td>
</tr>
</tbody>
</table>
Bachelor of Science in Industrial Technology

Industrial Technology is a field of study designed to prepare technical/management-oriented professionals for employment in business, industry, and government. The curriculum is organized to equip students with critical knowledge and skills for product innovation and process improvement.

Required 125 credit hours, and including:

### Essential Studies Requirements, see University ES listing.

- FIN 310 Principles of Financial Management 3
- MGMT 300 Principles of Management 3
- MGMT 301 Operations Management 3
- MRKT 305 Marketing Foundations 3
- MGMT 475 Strategic Management 3

**Total Credits**: 33

### Major Requirements

#### III. Industrial Technology Major Program Requirements: At least a 2.50 GPA in Requirement (2.50), see College section.

1. Courses that apply toward the degree and major, and the following:
   - TECH 499 Senior Capstone I 3
   - TECH 422 Industrial/Applied Graphic Design 3
   - TECH 423 Advanced Digital Photography and Imaging 3
   - TECH 433 Manufacturing Strategies 3
   - TECH 440 Occupational Safety 3
   - TECH 498 Senior Capstone I 1
   - TECH 411 Entrepreneurship Practice 3
   - TECH 412 Entrepreneurship Law & Operations 3
   - TECH 413 Entrepreneurial Opportunities and Concept Development 3

**Total Credits**: 21

#### IV. College of Business & Public Administration Graduation Requirements:

1. Earn a minimum cumulative GPA of 2.50
2. Earn a minimum UND GPA of 2.50
3. Earn a minimum cumulative major GPA of 2.50 (business administration courses that apply toward the degree and major)
4. Earn a minimum UND major GPA of 2.50 (business administration courses that apply toward the degree and major)
5. At least half of the business courses that apply toward the degree and major must be from UND

**Total Credits**: 48

### Minor in Graphic Design Technology

**The Minor in Graphic Design Technology has been suspended and no new applications are being accepted at this time.**

21 credits including the following courses:

- TECH 102 Digital Design Software 3
- TECH 212 Visual Literacy 3
- TECH 230 User Experience and Interface Design 3
- TECH 232 Web Design 3
- TECH 322 Digital Photography Fundamentals 3
- TECH 422 Advanced Digital Photography and Imaging 3

**Total Credits**: 21

### Finance (Fin)

**B.B.A. with Major in Investments** (p. 105)

**B.B.A. with Major in Managerial Finance and Accounting** (p. 106)

### Courses

**FIN 220. Personal Investing. 3 Credits.**

Investment concepts for individual investors who are, or will be, actively developing and monitoring their own investment portfolios. Covers basic analysis techniques, investment vehicles, strategies for implementing investment goals in a portfolio context, risk-return tradeoffs, and sources of investment information. Not available to students who have successfully completed FIN 420 or its equivalent. F,S.

**FIN 251. Personal Finance. 3 Credits.**

The personal financial planning and management process: goal identification and budgeting; minimizing tax liability; uses and costs of various forms of credit; buying, selling and/or leasing real estate, automobiles and other major items; life, health, property and income insurance; various investment options; the retirement planning process; and estate planning options. The role of financial planning professionals and financial planning as a career option are also discussed. F,S.

**FIN 310. Principles of Financial Management. 3 Credits.**

This course introduces students to asset management, cost of capital, dividend policy, valuation, capital structure planning, and working capital management. Forms of business organizations and tax environment are surveyed. Managerial implications of current developments in national and international capital markets are reviewed. Prerequisites: ACCT 201, ECON 210; Sophomore, Junior or Senior Standing; declared CoBPA majors only. F,S.
FIN 310L. Problems In Financial Management. 1 Credit.

FIN 321. Real Estate Finance and Investment. 3 Credits.
Nature of real estate finance, financial sources, role of government, real estate financial instruments, loan processing, defaults and foreclosures in real estate finance, fundamentals of real estate investment analysis. Prerequisites: FIN 310 and Sophomore, Junior or Senior standing. F.

FIN 324. Real Estate Appraisal. 3 Credits.
Nature of value; appraisal process; analysis of neighborhoods, land and improvements; cost, market data and income approach to value; appraisal report; code of ethics. Prerequisite: Sophomore standing or higher. S.

FIN 340. Intermediate Financial Management. 3 Credits.
Integrated coverage of topics in finance theory. This course continues to develop student understanding of corporate finance topics which were introduced in FIN 310. These topics include valuation, project analysis, capital structure planning, working capital management, and cash flow analysis. The course also introduces students to risk analysis, the capital asset pricing model, and investment analysis. Prerequisites: FIN 310 and Sophomore, Junior or Senior Standing; declared CoBPA majors only. F.S.

FIN 350. Financial Statement Analysis. 3 Credits.
Students interpret and evaluate financial statements used to report financial performance. Analysis incorporates accounting, financial, and economic models and data; and describes various reporting regulations, principles, rules, standards, and interpretations. The course includes an investigation of current issues and debates in financial statement reporting. Prerequisites: ACCT 301 and FIN 310; Sophomore, Junior or Senior Standing; declared CoBPA majors only. F.

FIN 360. Capital Market Financing and Investment Strategies. 3 Credits.
Covers analysis and procedures for implementing particular financing and investment plans in financial markets. Includes financing and investment through commercial banks, investment banks, pension funds, venture capital sources, insurance companies and limited partnerships. Prerequisites: ACCT 218 and FIN 310; Sophomore, Junior or Senior Standing; declared CoBPA majors only. F.S.

FIN 370. Student Investment Fund I. 1 Credit.
This is an introductory course to the Student Managed Investment Fund. It examines the issues involved in the management and investment strategies of a portfolio of financial assets. Students are required to attend Student Investment Fund meetings. Student members research prospective stocks, generate reports, make decisions to invest or liquidate, and execute the trades. Any recommendation to buy, sell, or retain a position in a security is presented to all student team members and to the Faculty Advisor. Repeatable up to a maximum of 3 credits. Prerequisite: Investments major or approval of instructor. Repeatable to 3 credits. F.S.

FIN 375. Lending and Liquidity Management. 3 Credits.
This course analyzes the short-term sources and uses of funds with primary emphasis on the management of liquidity in the context of a financial institution. The course also examines the risks and returns in a loan portfolio, particularly loans by financial institutions. Prerequisites: FIN 310; Junior or Senior Standing; declared CoBPA majors only. F.

FIN 397. Cooperative Education. 1-2 Credits.
On-the-job compensated work experience in various areas of Finance. Prerequisites: ACCT 200, ACCT 201, ISBC 117, ECON 201, ECON 202, ECON 210, and approval by department. Repeatable to 3 credits. S/U grading. F.S,SS.

FIN 415. Fixed Income Analysis and Portfolio Management. 3 Credits.
This course covers characteristics and analysis of fixed-income (or debt) instruments. Types of debt securities examined primarily include corporate (commercial paper, notes, and fixed- and floating-rate bonds without and with various embedded options) and U.S. Government (Treasury bills, Treasury bonds without and with inflation protection, and Agency debt). Those enrolled in the class will be responsible for actively managing a live bond portfolio. Prerequisites: FIN 310, FIN 360 and FIN 370; Junior or Senior Standing; declared CoBPA majors only. S.

FIN 420. Investment Analysis and Portfolio Management. 3 Credits.
Comprehensive study of methods used to evaluate securities. Includes formulation of investment strategy and analysis, design of portfolios for classes of individual investors and institutions, fundamental analysis and portfolio performance evaluation. Extensive use of financial databases and software. Prerequisites: FIN 340 and FIN 360; Junior or Senior Standing; declared CoBPA majors only. F.

FIN 430. International Financial Management. 3 Credits.
Financial management implications of exchange risk exposure, accounting conventions and international constraints on capital flows. Other topics include multi-national investment management and related financing problems, taxation and working capital management. Prerequisites: FIN 310 and Junior or Senior Standing; declared CoBPA majors only. S.

FIN 450. Financial Derivatives. 3 Credits.
Detailed analysis of major elements affecting market prices of options and futures contracts and analysis of optimal investment strategies involving these and other derivative instruments. Prerequisites: FIN 340 and FIN 360; declared CoBPA majors only. S.

FIN 470. Student Investment Fund II. 3 Credits.
The Student Managed Investment Fund is a sequence of courses whereby a select group of students manage a live portfolio. The course examines the issues involved in the management and investment strategies of a portfolio of financial assets. It focuses on asset allocation, portfolio monitoring and evaluation, portfolio rebalancing, and investment analysis. The students selected to manage the fund are responsible for the investment decisions involving the composition of the portfolio under the supervision of Finance department faculty. Student members establish the stock selection criteria, research the prospective stocks, generate reports, and make decisions to invest or liquidate, and execute the trades. Oral presentations are required. Repeatable to a maximum of 6 credits. Prerequisites: FIN 310, 340 and 370 and declared CoBPA majors only. Repeatable to 6 credits. F.

FIN 475. Cases in Managerial Finance. 3 Credits.
Introduces students to construction and utilization of financial management decision models using case study examples. Topics evaluated include working capital management, capital budgeting, cost of capital, capital structure, dividend policy, valuation, risk-return, and special topics of financial management. Students are required to develop original simulation models, prepare formal case reports, and orally and visually present their results. Prerequisites: FIN 340 and FIN 360; Junior or Senior Standing; declared CoBPA majors only. S.

FIN 491. Senior Topics in Finance. 3 Credits.
Multiple sections covering different topics may be offered in any one semester. Provides opportunities for in-depth study beyond that of regularly scheduled courses. May be seminars, workshops, or lecturers. Repeatable to 6 credits. Prerequisites: FIN 310; consent of instructor; Junior or Senior Standing; declared CoBPA majors only. Repeatable to 6 credits. F.S.

FIN 492. Readings and Research in Finance. 1-3 Credits.
Designed for students with an interest in finance topics not covered in regularly schedule courses. Repeatable to 6 credits. Prerequisites: FIN 310 and approval by department. Repeatable to 6 credits. F.S.

FIN 497. Internship in Finance. 1-3 Credits.
Guided practical experience in managerial finance, investment management, real estate, and insurance with public and private sector enterprises. Prerequisites: ACCT 200, ACCT 201, ISBC 117, ECON 201, ECON 202, ECON 210, and approval by department. Repeatable to 6 credits. S/U grading. F.S,SS.

Bachelor of Business Administration with Major in Investments

B.B.A. with Major in Investments

Required 125 credits (36 of which must be numbered 300 or above, and 60 of which must be from a 4-year institution) including:

I. Essential Studies Requirements (see University ES listing).

II. The College of Business and Public Administration Requirements, see College listing and including:

- ACCT 200 Elements of Accounting I
- ACCT 201 and Elements of Accounting II
- ACCT 315 Business Law I
- ISBC 117 Personal Productivity with Information Technology
- ISBC 217 Fundamentals of Computer Information Systems
Bachelor of Business Administration with Major in Managerial Finance and Accounting

Required 127 credits (36 of which must be numbered 300 or above, and 60 of which must be from a 4-year institution) including:

I. Essential Studies Requirements (see University ES listing).

II. The College of Business and Public Administration Requirements, see College listing and including:

- **ACCT 200**: Elements of Accounting I & Elements of Accounting II 6
- **ACCT 315**: Business Law I 3
- **ISBC 117**: Personal Productivity with Information Technology 1
- **ISBC 217**: Fundamentals of Computer Information Systems 3
- **ECON 201**: Principles of Microeconomics 3
- **ECON 202**: Principles of Macroeconomics 3
- **ECON 210**: Introduction to Business and Economic Statistics 3
- **ECON 203**: Money and Banking 3
- **MATH 103**: College Algebra 3
- **MATH 146**: Applied Calculus I 3
- **MGMT 300**: Principles of Management 3
- **MGMT 301**: Operations Management 3
- **FIN 310**: Principles of Financial Management 3
- **FIN 340**: Intermediate Accounting I 3
- **FIN 350**: Intermediate Accounting II 3
- **FIN 360**: Capital Market Financing and Investment Strategies 3
- **FIN 370**: Applied Security Analysis 1
- **FIN 415**: Fixed Income Analysis and Portfolio Management 3
- **FIN 420**: Investment Analysis and Portfolio Management 3
- **FIN 430**: International Financial Management 3
- **FIN 450**: Financial Derivatives 3
- **FIN 470**: Student Investment Fund II 3
- **FIN 497**: Internship in Finance (no more than 3 credits) 3
- **SPRT 320**: Sport Financial Management 3
- **FIN 375**: Lending and Liquidity Management 3
- **FIN 475**: Cases in Managerial Finance 3
- **ACCT 309**: Accounting Information Systems 3
- **ACCT 301**: Intermediate Accounting I 3
- **ACCT 302**: Intermediate Accounting II 3
- **ACCT 300**: Financial Statement Analysis 3
- **ECON 210**: Introduction to Business and Economic Statistics 3

Total Credits 55

III. The Following Major Courses:

- **ACCT 218**: Advanced Spreadsheet Applications 3
- **ACCT 300**: Intermediate Accounting I 3
- **ACCT 302**: Intermediate Accounting II 3
- **ACCT 309**: Accounting Information Systems 3
- **ACCT 320**: Cost Accounting 3
- **FIN 340**: Intermediate Financial Management 3
- **FIN 350**: Financial Statement Analysis 3
- **FIN 360**: Capital Market Financing and Investment Strategies 3
- **FIN 475**: Cases in Managerial Finance 3

Select three upper-division courses from Accountancy (Acct) or Finance (Fin)

Total Credits 36

### Fine Arts (FA)

#### Courses

**FA 150. Introduction to the Fine Arts. 3 Credits.**

Introduction to the fundamental principles of the Fine Arts -- Visual Arts, Music, Theatre, and Dance -- followed by examples of the interaction of the arts in selected cultures from history and around the world and at a variety of campus arts events, in order to increase appreciation of the importance of the fine arts to the individual and community. F.S.

### Forensic Science

B.S. with Major in Forensic Science (p. 108)

#### Courses

**ANTH 100. Introduction to Anthropology. 3 Credits.**

An introduction to the breadth of inquiry pursued by anthropologists, including the origins and biological evolution of humans, the prehistoric development of world cultures, and the interplay of biological, social, and cultural factors in present day societies. On demand.

**ANTH 170. Introduction to Biological Anthropology. 3 Credits.**

An introduction to the field of biological or physical anthropology. This course will provide a general background in human evolutionary biology. F.S.

**ANTH 171. Introduction to Cultural Anthropology. 3 Credits.**

Examination of diversity and similarities across contemporary world societies. Topics: fieldwork and ethnographic description; theoretical approaches; communication/human language; interrelationships between environment, technology, social and political organization and worldview; sociocultural change; applied anthropology. Films and case studies illustrate intricacies of culture and how an anthropological perspective provides insights about our own society/culture. F.S.
ANTH 172. Introduction to Archaeology. 3 Credits.
This course looks at how we investigate past cultures using the artifacts that people have left behind. What questions do archaeologists ask about the past? How do archaeologists find and record archaeological sites? What field and laboratory techniques are used to collect evidence and gather data, and how do these methods work? How do we interpret and understand the past using archaeological hypotheses, explanations, models and theories? Case studies will be drawn from different regions, cultures, and time periods to illustrate course concepts. F.S.

ANTH 200. World Prehistory. 3 Credits.
In this course we explore the extraordinary five million year-long record of human cultural achievements, as reconstructed by scientific archaeology. We will focus on prehistoric societies (those that existed before the advent of writing and written history), on what happened in the past, and how the major milestones in the development of world cultures came about. These milestones include the cultural evolution of our earliest hominid ancestors from almost 5 million years ago, the two million year-long persistence of the hunting and gathering lifeway, the origins of agriculture and farming societies, and the rise and collapse of prehistoric civilizations. F.S.

ANTH 209. Special Topics. 1-4 Credits.
Repeatable when topics vary. Repeatable. F.S.

ANTH 270. Introduction to Forensic Anthropology. 3 Credits.
Forensic anthropology is the study of skeletal remains in a medico-legal context for the purpose of identification and trauma analysis. This course covers the history of this field, its relevance to death investigation in the United States, and the theories and techniques applied to skeletal identification. On demand.

ANTH 300. Archaeological Laboratory Methods. 3 Credits.
A hands-on introduction to the basic processing, organizing, and analytical techniques used in the archaeological laboratory. Excavated materials from prehistoric sites will be used for lab exercises and demonstrations. Includes lecture and lab. Prerequisites: ANTH 172 and permission of instructor. S.

ANTH 309. Special Topics. 1-4 Credits.
Repeatable when topics vary. Repeatable. F.S.

ANTH 325. Human Origins. 3 Credits.
A description of the fossil evidence for primate and human evolution with an emphasis on the origins and evolution of the hominid and human lines. Prerequisite: ANTH 170 or consent of instructor. On demand.

ANTH 330. Human Variation. 3 Credits.
An examination of the range of human physical variation, with a special emphasis on its adaptive nature. Prerequisite: ANTH 170 or consent of instructor. On demand.

ANTH 335. Primates. 3 Credits.
A survey of the biology and behavior of the living primates, with a special emphasis on similarities and differences to humans. On demand.

ANTH 340. Medical Anthropology. 3 Credits.
An examination of the human biological and cultural responses to health and disease as seen from an anthropological perspective. F.

ANTH 350. Ethnographic Methods. 3 Credits.
Introduction to fieldwork methods and analytic approaches used by cultural anthropologists in their ethnographic research; class discussion topics will include ethical issues, framing of research problems, the writing of ethnographic accounts, and modes of presentation of research results. Prerequisite: ANTH 171 or by special permission. On demand.

ANTH 360. Environmental Change & Culture. 3 Credits.
This course uses an anthropological lens to understand how humans have responded to and/or caused environmental changes and how differing cultural values and behaviors have shaped this relationship. By the end of the course students should be able to (1) explore how power and privilege impact us and others and how this relates to race, ethnicity, cultural identity, economic class, and environmental discrimination and (2) use worldview as a tool to understand different cultural responses to environmental challenges. Present and past cultural examples from around the world are examined to provide background for class discussions and exploration of hot topics and challenges that currently face us and how this relates to our diverse beliefs and levels of local and global power. F, odd years.

ANTH 370. Language and Culture. 3 Credits.
Fundamentals of modern linguistics; utility of linguistic concepts of culture analysis; interaction of language with other cultural subsystems. Prerequisite: ANTH 171 or consent of instructor. S.

ANTH 371. Cultural Dynamics. 3 Credits.
Focus on sociocultural change along a selected theme, such as "the local and the global," "ethnic minorities and nation-states," or "ethnographer as researcher and writer." Also considered are theoretical orientations in the study of society/culture, fieldwork, ethics, and anthropologists' roles with respect to public policy. Repeatable to 9 credits if topics vary. Prerequisite: ANTH 171. Repeatable to 9 credits. F.

ANTH 372. Culture Theory. 3 Credits.
An overview of the ideas and approaches that have played a role in the development of anthropological studies of societies and cultures. Focus on the contributions of major figures in anthropology, in the past and at present, as well as current issues within the discipline. Prerequisite: ANTH 171.

ANTH 373. Indians of Latin America. 3 Credits.
Examination of traditional and modern Indian cultures of Latin America. Focus on the adaptation to cultural change, the impact of world economy, and the impact of resource exploitation on indigenous peoples. Prerequisite: ANTH 171.

ANTH 375. Women in Prehistory. 3 Credits.
This course will explore recent research that explicitly illuminates women's roles, behaviors and ideologies in the ancient past, and will examine methodological and theoretical attempts to understand how gender can be retrieved from the archaeological record. On demand.

ANTH 376. The Aztec, Maya and Inca. 3 Credits.
An examination of the high civilizations of Latin America with focus on the Aztec, Maya and Inca. On demand.

ANTH 377. North American Archaeology. 3 Credits.
Explores the fascinating cultural developments that have taken place throughout prehistory in North America (north of Mexico), ranging from the first peopling of the Americas to the emergence of complex chiefdoms, and from hunting and gathering to the development of intensive agriculture. On demand.

ANTH 378. Physical Anthropology Method and Theory. 1-4 Credits.
A discussion of current theoretical arguments within the field of physical anthropology and the techniques used to examine them. Prerequisite: ANTH 170. S.

ANTH 379. Culture Area Studies. 3 Credits.
A survey of peoples and cultures of selected areas. Selections based upon staff and student interest. May be repeated to maximum of 6 credits. Repeatable to 6 credits. F.S.

ANTH 380. Field Techniques in Archaeology. 1-6 Credits.
Prerequisites: ANTH 172 and permission of instructor. SS.

ANTH 385. Antiquities, Culture and Law. 3 Credits.
This course is an exploration of the complex cultural, ideological and legal issues involved in contemporary views of the ancient past and its material record. Students will examine how antiquities, archaeological sites, landscapes and monuments are defined and shaped by current cultural identities, notions of privacy, human rights, power and prestige, and global conflicts. National and international laws that regulate the antiquities trade and address the illegal trafficking of artifacts will also be explored in the context of ethics and social problems. On demand.

ANTH 388. Method and Theory in Archaeology. 3 Credits.
This course explores how archaeologists reconstruct the past: how they formulate research problems and conduct field work; what field and laboratory analytical tools they employ; and how they use data, models, and theory to explain culture change. Techniques, methods, and theoretical frameworks used in modern prehistoric archaeology are examined. Readings in the professional literature, case studies, and guest lecturers provide vivid examples of archaeologists in thought and action. Prerequisite: ANTH 172 or consent of instructor. S.

ANTH 420. Archaeological Origins of Plant and Animal Use. 3 Credits.
This course uses archaeological information to examine the relationships between humans and the plant and animal resources we exploit and will focus on specific examples of economic uses of both wild and domestic species, covering both prehistoric and modern consequences of how we interact with biological resources. Basic issues in floral and faunal analysis such as the recovery, quantification, analysis, and interpretation of plant and animal remains from archaeological sites will be presented in depth. Prerequisite: ANTH 172. On demand.

ANTH 426. Lithic Technology. 3 Credits.
Study of prehistoric stone tool technology and examination of the analytical methods used by archaeologists in lithics research. Prerequisite: ANTH 172 or consent of instructor. F, odd years.
ANTH 439. Human Osteology. 4 Credits.
This course is an intensive examination of human skeletal anatomy, covering the features of the entire human skeleton and the relationship of human osteology to other fields, including paleoanthropology, palaeopathology, forensic anthropology, and vertebrate anatomy. Prerequisite: ANTH 170 or ANTH 270 or ANAT 204 or consent of instructor. F.

ANTH 441. Forensic Anthropology Field School. 1-6 Credits.
This course is a hands-on exposure to the field and laboratory methods of forensic anthropology. Prerequisite: Consent of instructor. SS.

ANTH 465. Culture, Illness and Health. 3 Credits.
Examination of culturally-based beliefs and practices involved in maintenance of health and the handling of illness in non-Western and modern societies. Prerequisite: ANTH 171 or consent of instructor. S.

ANTH 480. Senior Seminar. 3 Credits.
The seminar will examine current debates or an area of study involving two or more subfields of anthropology. The seminar will provide an opportunity for students to integrate knowledge and skills obtained in anthropology. Prerequisites: Senior major status and completion of two of the three method and theory requirements (cultural, archaeology, physical); or departmental permission. S.

ANTH 489. Senior Honors Thesis. 1-8 Credits.
Supervised independent study culminating in a thesis. Repeatable to 9 credits. Repeatable to 9 credits. F,S,SS.

ANTH 492. Independent Studies. 1-4 Credits.
Independent research conducted under advisement with department faculty. Research is student originated and developed. Prerequisite: Consent of the instructor. Repeatable to 16 credits. F,S.

ANTH 494. Readings in Anthropology. 1-5 Credits.
Designed for students who want instruction in subjects not covered adequately or more subfields of anthropology. The seminar will provide an opportunity for students to integrate knowledge and skills obtained in anthropology. Prerequisites: Junior or Senior status, satisfactory completion of CHEM 122 and BIOL 151, and instructor consent. S/U grading. F,S,SS.

ANTH 497. Forensic Science Internship. 1-12 Credits.
Students may enroll in this course after they have secured an intern position in a law enforcement agency, crime laboratory or other institution providing procedural and/or analytical processing of evidence from criminal or civil proceedings. Credits obtained will be determined based on length and content of the internship and course responsibilities. Prerequisites: Junior or Senior status, satisfactory completion of CHEM 122 and BIOL 151, and instructor consent. F,S,SS.

Bachelor of Science with Major in Forensic Science

Required 120 credits (36 of which must be numbered 300 or above, and 30 of which must be from UND) including:

I. Essential Studies Requirements (see University ES listing)

II. Required curriculum

Required curriculum:

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FS 120</td>
<td>Introduction to the Forensic Sciences</td>
<td>3</td>
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<tr>
<td>FS 345</td>
<td>Forensic Science</td>
<td>3</td>
</tr>
<tr>
<td>FS 346</td>
<td>Analysis of Forensic Evidence</td>
<td>3</td>
</tr>
<tr>
<td>FS 400</td>
<td>Forensic Science Applied Experiences</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 120</td>
<td>Introduction to Ethics</td>
<td>3</td>
</tr>
<tr>
<td>A&amp;S 260</td>
<td>Exploring Topical Challenges</td>
<td>3</td>
</tr>
<tr>
<td>CJ 201</td>
<td>Introduction to Criminal Justice</td>
<td>3</td>
</tr>
<tr>
<td>CJ 342</td>
<td>Criminal Procedure</td>
<td>3</td>
</tr>
<tr>
<td>CJ 352</td>
<td>Criminal Investigation</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 151</td>
<td>General Biology I</td>
<td>4</td>
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<tr>
<td>&amp; 151L</td>
<td>and General Biology II Laboratory</td>
<td></td>
</tr>
<tr>
<td>CHEM 121</td>
<td>General Chemistry I</td>
<td>4</td>
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<tr>
<td>&amp; 121L</td>
<td>and General Chemistry I Laboratory</td>
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</tr>
<tr>
<td>CHEM 122</td>
<td>General Chemistry II</td>
<td></td>
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<tr>
<td>&amp; 122L</td>
<td>and General Chemistry II Laboratory</td>
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<tr>
<td>CHEM 340</td>
<td>Survey of Organic Chemistry</td>
<td>5</td>
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<tr>
<td>&amp; 340L</td>
<td>and Survey of Organic Chemistry Laboratory</td>
<td></td>
</tr>
<tr>
<td>PHYS 161</td>
<td>Introductory College Physics I</td>
<td>4</td>
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<tr>
<td>or PHYS 211</td>
<td>College Physics I</td>
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</tr>
<tr>
<td>PHYS 162</td>
<td>Introductory College Physics II</td>
<td>4</td>
</tr>
<tr>
<td>or PHYS 212</td>
<td>College Physics II</td>
<td></td>
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<tr>
<td>Select one of the following:</td>
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<tr>
<td>BIOL 470</td>
<td>Biometry</td>
<td>3-4</td>
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<tr>
<td>or SOC 326</td>
<td>Sociological Statistics</td>
<td></td>
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<tr>
<td>or PSYC 241</td>
<td>Introduction to Statistics</td>
<td></td>
</tr>
<tr>
<td>Select one of the following:</td>
<td></td>
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<tr>
<td>MATH 146</td>
<td>Applied Calculus I</td>
<td>3</td>
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<tr>
<td>or MATH 165</td>
<td>Calculus I</td>
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</table>

Total Credits: 58-59

Optional Sub-Plans:

CHEMICAL ANALYSIS

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 331</td>
<td>Analytical Chemistry</td>
<td>4</td>
</tr>
<tr>
<td>&amp; 333L</td>
<td>and Analytical Chemistry Laboratory</td>
<td></td>
</tr>
<tr>
<td>CHEM 341</td>
<td>Organic Chemistry I</td>
<td>4</td>
</tr>
<tr>
<td>&amp; 341L</td>
<td>and Organic Chemistry Laboratory</td>
<td></td>
</tr>
<tr>
<td>CHEM 342</td>
<td>Organic Chemistry II</td>
<td>4</td>
</tr>
<tr>
<td>&amp; 342L</td>
<td>and Organic Chemistry II Laboratory</td>
<td></td>
</tr>
<tr>
<td>CHEM 443</td>
<td>Instrumental Analysis III - Mass Spectrometry</td>
<td>2</td>
</tr>
<tr>
<td>PPT 410</td>
<td>Drugs Subject to Abuse</td>
<td>2</td>
</tr>
<tr>
<td>Complete at least 1 of the following course:</td>
<td>Both are strongly recommended</td>
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</tr>
<tr>
<td>CHEM 441</td>
<td>Instrumental Analysis I - Spectroscopy</td>
<td>2</td>
</tr>
<tr>
<td>or CHEM 442</td>
<td>Instrumental Analysis II - Electrochemistry</td>
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Total Credits: 18

CRIMINALISTICS

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CJ 210</td>
<td>Introduction to Policing</td>
<td>3</td>
</tr>
<tr>
<td>CJ 342</td>
<td>Criminal Procedure</td>
<td>3</td>
</tr>
<tr>
<td>CJ 365</td>
<td>Law and Society</td>
<td>3</td>
</tr>
<tr>
<td>CJ 340</td>
<td>What Works in Policing, Sentencing, and Corrections</td>
<td>3</td>
</tr>
<tr>
<td>Complete at least 2 of the following courses:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANAT 204</td>
<td>Anatomy for Paramedical Personnel and Anatomy for Paramedical Personnel Laboratory</td>
<td>6-9</td>
</tr>
<tr>
<td>or ANTH 439</td>
<td>Human Osteology</td>
<td></td>
</tr>
<tr>
<td>or BIOL 320</td>
<td>Forensic Biology</td>
<td></td>
</tr>
<tr>
<td>or BIOL 363</td>
<td>Entomology</td>
<td></td>
</tr>
<tr>
<td>or CJ 452</td>
<td>The Police Role in Society</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits: 18-21

FORENSIC MOLECULAR BIOLOGY

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 320</td>
<td>Forensic Biology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 315</td>
<td>Genetics</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 333</td>
<td>Population Biology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 410</td>
<td>Molecular Biology Techniques</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 415</td>
<td>Genomics</td>
<td>4</td>
</tr>
<tr>
<td>Complete at least 1 of the following courses:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANTH 439</td>
<td>Human Osteology</td>
<td>4</td>
</tr>
<tr>
<td>or BIOL 336</td>
<td>Systematic Botany</td>
<td></td>
</tr>
<tr>
<td>or BIOL 363</td>
<td>Entomology</td>
<td></td>
</tr>
</tbody>
</table>
General Studies

B.G.S. with a Major in General Studies (p. 109)

Bachelor of General Studies with a Major in General Studies

Required: 120 credits (30 of which must be from UND and 36 of which must be numbered 300 and above) including:

I. Essential Studies Requirements (see University ES listing).

II. A curriculum approved by the College of Arts & Sciences.

Optional Sub-Plan:

Students have the option of completing the Women and Gender Studies Sub-Plan. In order to complete this sub-plan, students must complete a minimum of 36 credits in the area/s of WGS, including:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>WGS 200</td>
<td>Introduction to Gender Studies</td>
<td>3</td>
</tr>
<tr>
<td>WGS 225</td>
<td>The Study of Women</td>
<td>3</td>
</tr>
<tr>
<td>WGS 480</td>
<td>Feminist Theory</td>
<td>3</td>
</tr>
</tbody>
</table>

The remaining 27 credits can be made up of the following courses. This list is not exhaustive. Students should consult with their WGS advisor to confirm their plan of study.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>WGS 492</td>
<td>Senior Study: Women and Gender Studies</td>
<td>1-4</td>
</tr>
<tr>
<td>ANTH 372</td>
<td>Culture Theory</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 375</td>
<td>Women in Prehistory</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 357</td>
<td>Women Writers and Readers</td>
<td>3</td>
</tr>
<tr>
<td>CJ 302</td>
<td>Women, Crime, and Criminal Justice</td>
<td>3</td>
</tr>
<tr>
<td>CJ 361</td>
<td>Victimology</td>
<td>3</td>
</tr>
<tr>
<td>COMM 310</td>
<td>Media and Diversity</td>
<td>3</td>
</tr>
<tr>
<td>HIST 332</td>
<td>Women in Early America</td>
<td>3</td>
</tr>
<tr>
<td>HIST 333</td>
<td>Women in Modern America</td>
<td>3</td>
</tr>
<tr>
<td>IS 346</td>
<td>Gender in American Indian Cultures</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 360</td>
<td>Feminist Philosophy</td>
<td>3</td>
</tr>
<tr>
<td>POLS 321</td>
<td>International Human Rights</td>
<td>3</td>
</tr>
<tr>
<td>POLS 351</td>
<td>Women and Politics</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 210</td>
<td>Human Sexuality</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 365</td>
<td>Psychology of Women</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 421</td>
<td>Diversity Psychology</td>
<td>3</td>
</tr>
<tr>
<td>RELS 216</td>
<td></td>
<td>3</td>
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<tr>
<td>RELS 466</td>
<td>Sex, Gender and Religion</td>
<td>3</td>
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</table>

Total Credits: 19

FORENSIC WILDLIFE BIOLOGY

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 150/L</td>
<td>Forensic Biology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 336</td>
<td>Systematic Botany</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 363</td>
<td>Entomology</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 426</td>
<td>Birds &amp; Mammals</td>
<td>4</td>
</tr>
</tbody>
</table>

Complete at least 1 of the following courses:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 376</td>
<td>Animal Biology</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 376L</td>
<td>and Animal Biology Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>or BIOL 333</td>
<td>Population Biology</td>
<td>4</td>
</tr>
<tr>
<td>or BIOL 410</td>
<td>Molecular Biology Techniques</td>
<td>4</td>
</tr>
<tr>
<td>or BIOL 432</td>
<td>Techniques in Wildlife Population Assessment</td>
<td>4</td>
</tr>
</tbody>
</table>

Total Credits: 21

Geography and Geographic Information Science (Geog)

B.S. with a Major in Geography (p. 112)

Minor in Geography (p. 113)

Minor in Geospatial Technologies (p. 113)

The geography courses that may be used to satisfy the 4-credit Essential Studies laboratory science requirement are Geography 121 and 134.

The geography courses that may be used to satisfy the 9-credit Essential Studies social science requirement include: Geography 151, 161 and 262.

Courses

GEOG 121. Global Physical Environment. 3 Credits.
A study of the pattern of distribution of the physical elements of the global environment. The origin and characteristics of the terrestrial grid, earth-space relations, climate, landforms, vegetation, and soils. F.S.S.

GEOG 121L. Global Physical Environment Laboratory. 1 Credit.
A basic environmental science laboratory to complement Geography 121. F.S.S.

GEOG 122. Foundations of Environmental Science. 3 Credits.
Introduction to the study of environmental dimensions of human activities, emphasizing the interdisciplinary nature of environmental studies. The course integrates principles of natural science, social science, policy, and humanistic perspectives needed understand and solve environmental problems, and to communicate those problems, policy options, and solutions to various constituencies. S.

GEOG 134. Introduction to Global Climate. 3 Credits.
An introduction to the global climate, emphasizing atmospheric processes, weather and climate elements, and climate change. Emphasis is placed upon the factors that control climate and climatic distributions. S.

GEOG 134L. Introduction to Global Climate Laboratory. 1 Credit.
A basic physical science laboratory focused upon specific atmospheric-climatic phenomenon; wet and dry lab experiments, plus written lab exercises. S.

GEOG 151. Human Geography. 3 Credits.
A systematic analysis of people's cultural regions including settlement patterns and change via migration and diffusion. F.S.

GEOG 161. World Regional Geography. 3 Credits.
Development of the concept of region with analysis of the relationship of physical and cultural features to the contemporary world situation. F.S.

GEOG 250. Introduction to Geopolitics. 3 Credits.
As a branch of political geography, the study of Geopolitics is concerned with the spatial dynamics of power relations especially at the international level. From a geographic perspective, this course surveys changing relations among states and the influences of national and transnational actors and events. The course attempts to help students apply a broad range of theoretical perspectives to the analysis of global and regional issues and events, and develop insights into what is happening in the world today. From war and terrorism to economic globalization, human rights and sustainable development, this course will explore a myriad of important issues and challenges that face the world today. S.

GEOG 262. Geography of North America I. 3 Credits.
A spatial approach to the development of Canada and the United States which emphasizes the transformation of the cultural landscape by exploring the contributions of the diverse peoples who inhabit the two nation-states and deal with a global economy. F.

GEOG 263. Geography of North Dakota. 3 Credits.
Study of the interrelationships that exist between North Dakota's physical and cultural environments. Specific topics include physiography, climate, flora, prehistoric occupation, historic development, demography, and economic structures. S.
GEOG 274. Introduction to Geospatial Technologies. 3 Credits. Students engage with a range of geospatial technologies to explore, analyze, and represent geographical phenomena and data through a series of field-based exercises. Students will learn about the types of societal problems that geospatial scientists are uniquely positioned to solve. Through guest speakers, readings, and discussions, they will learn about the knowledge and skills required to enter this rapidly-expanding career field and the courses in the geography curriculum that will help them to acquire these skills. F.

GEOG 300. Special Topics in Geography. 1-3 Credits. Topic of course will change from semester to semester but will typically emphasize recent developments in geography. Repeatable to six credits. Repeatable to 6 credits. F.S.SS.

GEOG 322. Environmental Hazards. 3 Credits. An overview of the field of environmental hazards emphasizing risk assessment, hazard impacts, human vulnerability, and hazard mitigation. Prerequisites: GEOG 121 and GEOG 161 or consent of instructor. F., even years.

GEOG 334. Climatology. 3 Credits. An overview of the field of climatology, emphasizing surface transfers of energy and water, the general circulation of the atmosphere, and climate change. Prerequisites: GEOG 134 or ATSC 110. S., odd years.

GEOG 352. Economic Geography. 3 Credits. A study of the local, national, and global economic life describing and explaining the geographic factor involved in the production, distribution, and consumption of the major commodities and resources of the world. Special emphasis is placed upon the global issue of the underdeveloped or Third World countries and theories, which have been developed to explain spatial structure. Prerequisite: Sophomore standing or consent of instructor. F.

GEOG 362. Geography of Canada. 3 Credits. A regional and topical analysis of the physical, cultural, and economic features of Canada. S.

GEOG 374. Environmental Remote Sensing. 2 Credits. A thorough examination of optical, infrared, and microwave methods for remote observation of Earth systems, with a focus on the use of aircraft and satellite data for addressing environmental problems. The course includes an overview of modern remote sensing systems for data collection at a variety of scales, as well as an introduction to digital image processing. Corequisite: GEOG 374L. F.

GEOG 374L. Environmental Remote Sensing Laboratory. 1 Credit. A systematic coverage of visual and digital laboratory techniques used to interpret aerial photography and satellite imagery. Students gain hands-on experience assessing environmental problems using remotely sensed data. Corequisite: GEOG 374. F.

GEOG 378. Global Positioning Systems: Applications and Theory. 2 Credits. This course examines the equipment, procedures, and techniques related to GPS technology, as well as its integration with Geographic Information Systems. Foci include the fundamentals of satellite navigation, the history of GPS, and applications related to mapping and analysis in the environmental sciences. Strong emphasis is placed on providing hands-on experience. S., even years.

GEOG 386. Geography Education Field Placement. 1-3 Credits. A variable credit course with amount of credit depending upon the extent of the geographic education work of the student in a K-12 school setting. Recommended for secondary education social studies majors interested in how geography is taught at the high school level and for elementary/middle school social studies majors concerned about how federal legislation is affecting teaching grades K-8. Prerequisite: Department approval. Repeatable. F.S.SS.

GEOG 397. Cooperative Education. 1-6 Credits. A practical work experience with an employer closely associated with geography. May be repeated to a maximum of 6 credits. Prerequisites: 60 credits completed and a minimum GPA of 2.75 or consent of Department Co-op Coordinator and Chair. Repeatable to 6 credits. F.S.U grading. F.S.SS.

GEOG 421. Selected Topics in Physical Geography. 3 Credits. An examination of an advanced physical geography topic chosen from field methods, biogeography, human impact on the environment, physiography, or others. Repeatable to nine credits if different topics are examined. Prerequisite: GEOG 121 or consent of instructor. Repeatable to 9 credits. F.S.

GEOG 453. Historical Geography. 3 Credits. Using the spatial approach, landscape change is analyzed over time in various regions of the world using a variety of scales of study. Emphasis is placed upon the relationship of historical geography to historic preservation and tourism. On demand.

GEOG 454. Conservation and Sustainable Use of Natural Resources. 3 Credits. Geographic principles applied to the analysis of natural resources and their efficient utilization. Emphasis is on sustainable development. S.

GEOG 457. Urban Geography and Planning. 3 Credits. This course examines the internal workings of cities from political, economic, and social perspectives. Geographic approaches to urban analysis are discussed, as are various methods for contemporary urban planning. Students learn to view the city as a geographic phenomenon created by human effort. S.

GEOG 458. Community Development. 3 Credits. This course examines the historical evolution, conceptual framework, and implementation of community development. Students will be introduced to a broad range of community development issues from a geographical perspective with emphasis on local and statewide scales of study. Prerequisite: GEOG 151 or consent of instructor. F.

GEOG 459. Population Geography. 3 Credits. The core components of population change (fertility, mortality, migration) are explored in the context of contemporary and historical population debates. The course focuses on understanding and critically assessing global, regional, national, and local population trends and issues. Topics include the impact of population growth, spatial diffusion processes, migration trends and theories, aging of societies, and population policies. S., even years.

GEOG 462. Geography of North America II. 3 Credits. A regional analysis of the physical, cultural, and economic features of a selected region or group of regions within North America. May be repeatable to six credits if a different region is examined. Prerequisite: GEOG 262 or consent of instructor. On demand.

GEOG 463. Regional Geography. 2-3 Credits. A regional and topical analysis of the physical and cultural features with emphasis on one continent or region. May be repeated up to nine credits provided different regions and approaches are involved. Repeatable to 9 credits. S.

GEOG 471. Cartography and Visualization. 2 Credits. This course examines the art, science, and technology of cartography and visualization. It familiarizes students with basic cartographic principles and with GIS, both of which are applicable to a wide range of professional fields and academic disciplines. Students learn how maps are designed and used to accurately represent and effectively communicate spatial phenomena and relationships. The course also includes a discussion of selection of proper thematic mapping techniques. Corequisite: GEOG 471L. F.

GEOG 471L. Cartography and Visualization Laboratory. 1 Credit. Students apply concepts learned in GEOG 471 to produce accurate, appropriate and well-designed maps using GIS software. Lab activities hone the ability of students to be informed producers and consumers of maps and provide hands-on experience that demonstrates how maps function as a communicative visual medium. Corequisite: GEOG 471. F.

GEOG 474. Introduction to Geographic Information Systems (GIS). 2 Credits. An introductory course that examines the digital representation, manipulation, and analysis of geographic data, with emphasis on the analytical capabilities that GIS brings to bear on the solution of geographic problems. Prerequisites: GEOG 471 and 471L or equivalent consent of instructor. Corequisite: GEOG 474L. F.S.

GEOG 474L. GIS Laboratory. 1 Credit. Hands-on application of theory and methods associated with digital spatial data representation, manipulation, and analysis. Corequisite: GEOG 474. F.S.

GEOG 475. Digital Image Processing. 3 Credits. A course focused on the concepts and principles involved in the use of digital remotely sensed data as they are applied to environmental monitoring and natural resource management. Emphasis is placed on algorithm development and ‘hands-on’ application of digital techniques to select imagery. Prerequisites: GEOG 374 and 374L. S.
GEOG 476. Selected Topics in Geographic Information Systems. 3 Credits.
An examination of a specific application area or set of techniques in GIS including, but not limited to, Business GIS, Environmental GIS, GIS Databases, GIS Scripting and Web-Based GIS. Repeatable to six credits if different topics are examined. Prerequisites: GEOG 474 and GEOG 474L, or instructor consent. Repeatable to 3 credits. On demand.

GEOG 494. Directed Studies in Geographical Problems. 1-3 Credits. Designed for students who wish to explore advanced topics in Geography on an individual or small group basis. May be repeated to a maximum of six credit hours. Prerequisites: Upper division status and consent of instructor. Repeatable to 6 credits. F,S,SS.

GEOG 497. Geography Internship. 1-3 Credits. Must involve work of a geographical nature performed as an unpaid volunteer to a PVO, NGO, youth organization, service organization or other not-for-pay jobs either on or off campus. May be repeated to a maximum of three credit hours. Prerequisite: Geography major or minor or consent of the supervising faculty member. Repeatable to 3 credits. S/U grading. F,S,SS.

Bachelor of Arts with Major in Environmental Studies

Required 120 credits (36 of which must be numbered 300 or above, and 30 of which must be from UND) including:

I. Essential Studies Requirements (see University ES guidelines and course listings).

II. The Following Curriculum (39 Major Credits)

Core Required Courses (18 credits)
ENRV 100 Environmental Studies Seminar 1-3
ENRV 122 Foundations of Environmental Science 3
COMM 360 Communicating Science 3
ENGL 227 Introduction to Literature and Culture 3
GEOG 274 Introduction to Geospatial Technologies 3
GEOG 454 Conservation and Sustainable Use of Natural Resources 3

Electives (21 credits, minimum 3 credits in each area, additional 12 credits in Social Sciences and/or Humanities)
Natural Sciences (3 credits)
ATSC 110 Meteorology I 4
& 110L and Meteorology I Laboratory 4
ATSC 120 Severe and Hazardous Weather 3
BIOL 332 General Ecology 4
& 332L and Gen Ecology Lab 4
BIOL 336 Systematic Botany 4
BIOL 350 Plant Ecology 3
BIOL 360 Soil Ecology 3
BIOL 363 Entomology 4
BIOL 425 Ichthyology 3
BIOL 433 Aquatic Ecology 3
BIOL 439 Conservation Biology 3
BIOL 470 Biometry 4
CHEM 115 Introductory Chemistry & 115L and Introductory Chemistry Laboratory 4
CHEM 121 General Chemistry I & 121L and General Chemistry I Laboratory 4
CHEM 122 General Chemistry II & 122L and General Chemistry II Laboratory 4
CHEM 333 Analytical Chemistry & 333L and Analytical Chemistry Laboratory 4
CHEM 341 Organic Chemistry I & 341L and Organic Chemistry I Laboratory 4
CHEM 342 Organic Chemistry II & 342L and Organic Chemistry II Laboratory 4
CHEM 392 Special Problems in Chemistry 1-3

CHEM 443 Instrumental Analysis III - Chromatography/Mass Spectrometry 2
ESSP 200 Sustainability Science 3
ESSP 300 Land and Water Sustainability 3
ESSP 333 Oceanography 3
GEOG 121 & 121L Global Physical Environment and Global Physical Environment Laboratory 4
GEOG 134 Introduction to Global Climate 3
GEOG 322 Environmental Hazards 3
GEOG 334 Climatology 3
GEOG 374 Environmental Remote Sensing & 374L and Environmental Remote Sensing Laboratory 3
GEOG 377 Quantitative Applications in Geography & 377L and Spatial Analysis Laboratory 3
GEOG 421 Selected Topics in Physical Geography 3
GEOG 471 Cartography and Visualization 3
& 471L and Cartography and Visualization Laboratory 3
GEOG 474 Introduction to Geographic Information Systems (GIS) & 474L and GIS Laboratory 3
GEOG 475 Digital Image Processing 3
GEOG 476 Selected Topics in Geographic Information Systems 3
GEOL 101 Introduction to Geology 3
GEOL 103 Introduction to Environmental Issues 3
GEOL 205 Surviving on Planet Earth 3
GEOL 322 Geology, Society, and the Environment 3
GEOL 342 Conservation and Environmental Hydrology 3
GEOE 417 Hydrogeology 3
MATH 146 Applied Calculus I 3

Social Sciences (3-15 credits)
ANTH 171 Introduction to Cultural Anthropology 3
ANTH 350 Ethnographic Methods 3
ANTH 360 Environmental Change & Culture 3
ANTH 420 Archaeological Origins of Plant and Animal Use 3
COMM 206 Digital Communication: Fundamentals 3
COMM 300 Communication and Society 3
ESSP 160 Sustainability & Society 3
ESSP 310 Sustainable Food Systems 3
ESSP 330 Environmental Change: Adaptation & Mitigation 3
ESSP 420 Sustainable Energy 3
ESSP 450 Environmental and Natural Resource Economics 3
ESSP 460 Global Environmental Policy 3
GEOG 457 Urban Geography and Planning 3
GEOG 459 Population Geography 3
N&D 335 World Food Patterns 3
POLS 116 State and Local Government 3
POLS 250 Introduction to Public Administration 3
POLS 432 Public Policy Making Process 3
PSYC 111 Introduction to Psychology 3
PSYC 241 Introduction to Statistics 4
PSYC 361 Social Psychology 3
PSYC 366 Conflict Management 3
SOC 323 Sociological Research Methods 3
SOC 326 Sociological Statistics 3
SOC 331 Community Sociology 3
SOC 437 Population 3
TECH 300 Technology and Society 3

Humanities (3-15 credits)
ENGL 308 The Art of Writing Nonfiction 3
ENGL 369 Literature and Culture 3
HIST 325 American West 3
PHIL 342 Advanced Ethics 3
PHIL 253 Environmental Ethics 3
PHIL 304 Existentialism & Phenomenology 3
Bachelor of Science with Major in Environmental Studies

Required 120 credits (36 of which must be numbered 300 or above, and 30 of which must be from UND) including:

I. Essential Studies Requirements (see University ES guidelines and course listings).

II. The Following Curriculum (39 Major Credits)

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<td>ATSC 120 Severe and Hazardous Weather</td>
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<td>PHIL 450 Philosophy, Economics, and Politics</td>
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<tr>
<td>PHIL 451 Current Topics in Political Philosophy</td>
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Bachelor of Science with a Major Geography

Required 120 credits (36 of which must be numbered 300 or above, and 30 of which must be from UND) including:

I. Essential Studies Requirements (see University ES listing).
II. The following core curriculum courses for A and B sub-plans (25 or 26 credits):

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<tr>
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<th>Credits</th>
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<td>GEOG 121 &amp; 121L</td>
<td>Global Physical Environment and Global Physical Environment Laboratory</td>
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<td>GEOG 151</td>
<td>Human Geography</td>
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<td>GEOG 161</td>
<td>World Regional Geography</td>
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<td>GEOG 274</td>
<td>Introduction to Geospatial Technologies</td>
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<tr>
<td>GEOG 471 &amp; 471L</td>
<td>Cartography and Visualization and Cartography and Visualization Laboratory</td>
<td>3</td>
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<td>Conservation and Sustainable Use of Natural Resources</td>
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<td>GEOG 474 &amp; 474L</td>
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Select one of the following statistics courses:

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<td>Sociological Statistics</td>
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<td>ECON 210</td>
<td>Introduction to Business and Economic Statistics</td>
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<td>PSYC 241</td>
<td>Introduction to Statistics</td>
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<td>MATH 321</td>
<td>Applied Statistical Methods</td>
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<td>BIOL 470</td>
<td>Biometry</td>
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* Capstone Course

III. Select one of the following sub-plans:

**A: Global Human Environment Sub-plan**

Required (6 credits)

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<tbody>
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<td>GEOG 352</td>
<td>Economic Geography</td>
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<tr>
<td>GEOG 457</td>
<td>Urban Geography and Planning</td>
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Electives (6 credits)

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<td>GEOG 134</td>
<td>Introduction to Global Climate</td>
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<td>GEOG 134L</td>
<td>Introduction to Global Climate Laboratory</td>
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<tr>
<td>GEOG 250</td>
<td>Introduction to Geopolitics</td>
<td>3</td>
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<tr>
<td>GEOG 262</td>
<td>Geography of North America I</td>
<td>3</td>
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<td>GEOG 263</td>
<td>Geography of North Dakota</td>
<td>3</td>
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<tr>
<td>GEOG 300</td>
<td>Special Topics in Geography</td>
<td>1-3</td>
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<td>GEOG 322</td>
<td>Environmental Hazards</td>
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<td>GEOG 334</td>
<td>Climatology</td>
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<tr>
<td>GEOG 362</td>
<td>Geography of Canada</td>
<td>3</td>
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<tr>
<td>GEOG 421</td>
<td>Selected Topics in Physical Geography</td>
<td>3</td>
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<tr>
<td>GEOG 453</td>
<td>Historical Geography</td>
<td>3</td>
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</tbody>
</table>

* Chosen in consultation with the faculty adviser

**B: Geospatial Science Sub-plan**

Required (6 credits)

<table>
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<td>Environmental Remote Sensing Laboratory</td>
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<td>GEOG 475</td>
<td>Digital Image Processing</td>
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<td>GEOG 476</td>
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<td>GEOG 421</td>
<td>Selected Topics in Physical Geography</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 453</td>
<td>Historical Geography</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 476</td>
<td>Selected Topics in Geographic Information Systems</td>
<td>3</td>
</tr>
</tbody>
</table>

* must be different topic from required GEOG 476 class

**C: Teacher Licensure**

Through a partnership with the College of Education and Human Development and the Department of Teaching and Learning, students may seek secondary licensure in Geography. The following program of study must be completed:

I. The Geography major (sub-plan A or B described above). Geography majors seeking secondary licensure must have an adviser in the Geography Department and an adviser in the Department of Teaching and Learning. Elective courses in Geography specific to teaching must be selected in consultation with the academic adviser in Geography and Teaching and Learning.

II. Admission to the Secondary Program, normally while taking T & L 250 Introduction to Education. (See College of Education and Human Development (https://education.und.edu) for admission and licensing requirements.)

III. Students seeking the secondary teaching licensure in Geography must complete the Department of Teaching and Learning requirements in Secondary Education (See College of Education and Human Development (https://education.und.edu)).

**Minor in Geography**

Required 20 credits including:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 121 &amp; 121L</td>
<td>Global Physical Environment and Global Physical Environment Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>GEOG 151</td>
<td>Human Geography</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 161</td>
<td>World Regional Geography</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 274</td>
<td>Introduction to Geospatial Technologies</td>
<td>3</td>
</tr>
</tbody>
</table>

Electives 7

Total Credits 20

Electives in geography must include at least 6 credits at the 300 level or above.

**Minor in Geospatial Technologies**

This is a 21-credit minor that provides an introduction and advanced skills in geospatial technology including GIS, and remote sensing:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 274</td>
<td>Introduction to Geospatial Technologies</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 374</td>
<td>Environmental Remote Sensing</td>
<td>2</td>
</tr>
<tr>
<td>GEOG 374L</td>
<td>Environmental Remote Sensing Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>GEOG 471</td>
<td>Cartography and Visualization</td>
<td>2</td>
</tr>
<tr>
<td>GEOG 471L</td>
<td>Cartography and Visualization Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>GEOG 474</td>
<td>Introduction to Geographic Information Systems (GIS)</td>
<td>2</td>
</tr>
<tr>
<td>GEOG 474L</td>
<td>GIS Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>GEOG 475</td>
<td>Digital Image Processing</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 476</td>
<td>Selected Topics in Geographic Information Systems</td>
<td>3</td>
</tr>
</tbody>
</table>

Electives 3

* must be different topic from required GEOG 476 class
Harold Hamm School of Geology and Geological Engineering (Geol and GeoE)

B.S. Geology (p. 120)
B.S. in Geological Engineering (p. 119)
B.S. in Environmental Geoscience (p. 118)
B.S. in Earth Science (p. 118)
Minor in Geology (p. 121)

Geology Courses

GEOL 101. Introduction to Geology. 3 Credits.
Introduction to the dynamics of the Earth -- volcanoes, earthquakes, plate tectonics, streams, groundwater, glaciers, waves, wind, and landslides, with emphasis on the environmental applications of these processes. Introduction to the tools of the geologist -- minerals, rocks, maps, and aerial photographs. GEOL 101L may be taken concurrently. F,S,SS.

GEOL 101L. Introduction to Geology Laboratory. 1 Credit.
An introductory laboratory to complement GEOL 101. Field trip(s) included. Prerequisite or Corequisite: GEOL 101. F,S,SS.

GEOL 102. The Earth Through Time. 3 Credits.
The tracing of changes in the Earth and life through time, with emphasis on the record from North America. GEOL 102L may be taken concurrently. F,S.

GEOL 102L. The Earth Through Time Laboratory. 1 Credit.
An introductory laboratory to complement GEOL 102. Field trip included. Prerequisite or Corequisite: GEOL 102. F,S.

GEOL 103. Introduction to Environmental Issues. 3 Credits.
Introduction to Environmental Issues. A survey of environmental issues concerning society's interaction with Earth's natural systems and exploitation of Earth's resources. F,S.

GEOL 104. Geology of National Parks. 3 Credits.
An overview of the geology of U.S. National Parks. Unifying geological principles are emphasized. Major topics: sandstone parks, volcanic parks, hot springs and geothermal areas, caves and limestone parks, reefs and fossilized reefs, rivers and erosion, ice and glaciers, mountain building and mountain ranges. S.

GEOL 105. Selected Topics. 1-4 Credits.
A special topic course intended for non-geology majors. Subjects will include many issues of interest to non-geologists and non-scientists, such as earthquakes, evolution, gems, and the geology of National Parks. Repeatable when topics vary. Repeatable. On demand.

GEOL 106. Global Warming: The Facts and Myths. 3 Credits.
Global warming is the most debated current challenge to humans. A large, multifaceted and technically challenging topic, it has been diluted to popular slogans that at best catch some aspects of the issue and at the worst are over simplifications. Most of us who are directly affected by global warming do not understand the background, do not know what the assertions are based on, and can not evaluate the correctness of the arguments propagated in mass media such as newspapers and talk-radio. This class will provide students with a clear grasp of the science behind global warming discussion, the typical strategies (pros/cons) that are used in the popular media, and a good understanding of the science-based predictions of upcoming changes in the climate and environment. In addition to providing general scientific background to understand global warming and the science behind it, the class will visit the arguments that are used both for and against global warming. The graded written tests require students to address typical misinformation about global warming, show general knowledge of the scientific background, and recognize typical means to distort science in the mass media.

GEOL 111. Views of Earth and Planets. 3 Credits.
An introduction to Earth and the Solar System. Coverage includes: the planets and their moons, comets, asteroids, impact craters, meteorites, the sun, the solar system's origin, planetary atmospheres, the living Earth, the question of life elsewhere. F,S.

GEOL 111R. Views of the Earth and Planets Recitation. 1 Credit.
A recitation-discussion to complement GEOL 111. Corequisite: GEOL 111. S.

GEOE 203. Earth Dynamics. 3 Credits.
Introductory physical geology course that also includes elements of historical geology, geomorphology, geohazards, and ethics. Intended for engineering and geosciences majors. F.

GEOE 203L. Earth Dynamics Laboratory. 1 Credit.
Laboratory course to accompany Earth Dynamics lecture. The laboratory is delivered as on-campus and virtually using specific required products and digital material. F.

GEOL 205. Surviving on Planet Earth. 3 Credits.
This Essential Studies course stresses critical thinking in covering the basic strategies about humans succeeding on our planet including Earth's hazards (our restless Earth); the balance of life on Earth (evolution and extinction); water in our lives (too much and too little); energy (use and population demands); and global change (Earth as a unique, ongoing experiment). S.

GEOL 220. Computer Applications in Geology and Environmental Science. 2 Credits.
Introduction to the application of computers, software, and digital processing in the geological and environmental sciences. F.

GEOL 256. Critical Thinking in the Geosciences. 2 Credits.
An introduction to the study of geoscience and skills needed to successfully complete a geoscience degree. F.

GEOE 301. Petrophysics. 3 Credits.
Mineral and rock formation, identification and petrophysical properties, particularly with respect to porous rocks and their interactions with fluids. Prerequisite: GEOE 203. Corequisite: GEOE 301L. F.

GEOE 301L. Petrophysics Laboratory. 1 Credit.
Laboratory to accompany GEOE 301. Prerequisite: GEOE 203. Corequisite: GEOE 301. F.

GEOE 302. Reclamation Engineering. 3 Credits.
Principles of reclamation emphasizing: the need for reclamation; geology and hydrogeology of disturbed landscapes, geological, hydrological, and ecological reclamation objectives; current reclamation practices; reclamation of abandoned mine lands; reclamation design; laws, regulations, permits, bonds, and public perception. Includes laboratory and field trip. Prerequisite: GEOL 101 or GEOE 203 or consent of instructor. S.

GEOL 303. Selected Topics in Geology. 1-4 Credits.
Each topic is concerned with a special aspect of geology. May be repeated up to a maximum of 8 hours. Prerequisite: Consent of the instructor. Repeatable to 8 credits. On demand.

GEOL 311. Geomorphology. 4 Credits.
Dynamics of weathering, mass movement, running water, groundwater, waves, wind and ice in the production of landforms. Includes field trips and laboratory. Prerequisites: GEOL 101 or GEOE 203; MATH 165, PHYS 211, CHEM 121 or consent of instructor. F.

GEOL 318. Mineralogy. 3 Credits.
Survey of the origin, distribution and uses of rock-forming minerals. Introduction to mineral structures, crystal chemistry, and crystallography. Laboratory identification of common minerals in hand sample and petrographic thin section. Introduction to the use of the polarizing microscope. Includes field trip. Prerequisites: GEOL 101 or GEOE 203, CHEM 121 or consent of instructor. S.

GEOL 320. Petrology. 3 Credits.
Description, classification and origin of igneous, metamorphic, and sedimentary rocks. Field and laboratory study of rocks. Engineering properties of earth materials. Advanced aspects of optical mineralogy. Includes laboratory. Prerequisite: GEOL 318. F.

GEOL 321. Geochemistry. 3 Credits.
Application of the principles of chemistry to geologic and hydrogeologic problems. Origin and distribution of the chemical elements. Introduction to radiochemistry, isotopic geochemistry, and stable-isotope geochemistry. Prerequisites: GEOL 318, CHEM 122, and MATH 165 or consent of instructor. S.
GEOE 323. Engineering Geology. 2 Credits.
This course is to introduce the application of geological, hydrological and environmental principles to geotechnical/geological engineering design, construction and operation as well as various geohazards. Prerequisites: One introductory geology course and MATH 165. S.

GEOE 330. Structural Geology. 3 Credits.
Mechanics of rock deformation, analysis of rock structures, preparation and interpretation of geologic maps and cross sections showing structural and tectonic features. Includes laboratory. Prerequisites: GEOE 318, GEOE 320 and MATH 105. S.

GEOE 340. Digital Mapping Methods. 3 Credits.
This course integrates "hands-on" data acquisitions and map generation with an overview of the technology (GPS, lasers, and data management). Field projects focus on mapping methodology and laboratory projects focus on analysis and presentation. It is assumed that students have an undergraduate geology background and a basic knowledge of computer applications. Prerequisite: Junior Standing in geology.

GEOE 342. Conservation and Environmental Hydrology. 3 Credits.
Topics relating hydrology to the environment and water conservation, including the global and local hydrological cycle, flood occurrence and prediction, water pollution, erosion and sedimentation, wetlands, and water management. Prerequisites: Introductory geology course or upper division standing; MATH 103. S, odd years.

GEOE 356. Geoscience Lectures. 1 Credit.
Students attend and evaluate departmental lectures given by visiting scientists and engineers, faculty, and students. May be repeated once. May not be taken concurrently with GEOE 422. S/U grading. F.S.

GEOE 397. Cooperative Education. 1-8 Credits.
Individualized or group study on selected geoscience topics. May be taken more than one semester to maximum of 8 hours. Prerequisite: Consent of instructor. Repeatable to 8 credits. F,S,SS.

GEOE 418. Hydrogeological Methods. 2 Credits.
Field and laboratory methods used in hydrogeology; techniques of drilling, well and piezometer installation, determination of aquifer parameters, geophysical exploration, soil classification and analysis, ground water sampling and analysis. Includes field trip. Prerequisite: GEOE 417. F.

GEOE 419. Groundwater Monitoring and Remediation. 3 Credits.
Statistical methods for groundwater sampling and monitoring network design. Groundwater remediation and design; including strategies that remove contaminants for external treatment and strategies for in-situ contaminant treatment. Prerequisites: MATH 186, GEOE 417 and a statistics course (ECON 210, PSY 241, MATH 321 or MATH 353) or consent of instructor. S.

GEOE 420. Geology Capstone. 3 Credits.
Geology capstone entails information literacy and communication about Earth materials, processes and history. The course checks retention of earlier learning and insures significant addition to that learning. Prerequisite: GEOE 487. Corequisite: GEOE 494. F.S.

GEOE 421. Seminar I. 1 Credit.
Instruction and practice of oral and visual presentation in science and engineering. Includes preparation and delivery of artifact talks, chalk talks, and slide talks. Involves critical review of student presentations and departmental guest lectures. Prerequisite: GEOE 356. F.S.

GEOE 422. Seminar II. 1 Credit.
Continuation of GEOE 421 experience. Preparation and delivery of oral presentations in science and engineering, culminating in oral presentation of senior thesis (Geol 490) or Engineering Design (485). Includes critical review of student presentations and departmental guest lectures. Prerequisites: GEOE 421, senior or graduate status in departmental major. F.S.

GEOE 425. Design Hydrology for Wetlands. 3 Credits.
Principles of chemistry, geology, hydraulics, and hydrology applied to natural and constructed wetlands and other small catchments. Prerequisites: CHEM 121 and either CE 306/ME 306 or GEOE 417. S.

GEOE 427. Groundwater Modeling. 3 Credits.
Fundamentals of numerical modeling applied to groundwater flow. Spreadsheet calculations will be used to demonstrate the finite difference method applied to groundwater movement and storage. Simulation of practical groundwater problems will be performed with the U.S. Geological Survey's MODFLOW code. Prerequisites: GEOE 417 and MATH 265; some programming experience is recommended. On demand.

GEOE 445. Geomechanics. 3 Credits.
The objective of this course is to train the students to use fundamental principles and field and lab techniques of Rock Mechanics to analyze real-world problems, identify the optimal methods, and solve the practical geological engineering problems with the combination of field and laboratory, analytical and experimental means. Emphases will be on the fundamental principles and their application to practical engineering problems, both surface and underground. Prerequisites: GEOE 323 or consent of instructor. F.

GEOE 484. Geological Engineering Design. 3 Credits.
The first of a two-course sequence in geological engineering design. Define the design problem, establish design objectives, evaluate alternatives, specify constraints, determine a methodology, complete a formal design problem statement. Prerequisites: Advanced level standing in Geological Engineering and consent of advisor. F.

GEOE 485. Geological Engineering Design. 3 Credits.
Continuation of GEOE 484 taken the preceding semester. Systematic study and design, with determination of feasibility, careful assessment of economic factors, safety, reliability, aesthetics, ethics, and social and environmental impact. Results presented in GEOE 422 Seminar. Prerequisite: GEOE 484. Corequisite: GEOE 422. S.

GEOE 487. Research I. 1 Credit.
Identification and proposal of research project. Includes literature review, feasibility review, and formal project identification and written proposal. Selection of faculty research adviser within first month of semester. Prerequisite: Senior standing in departmental major. F.S.

GEOE 488. Research II. 2 Credits.
Execution of research plan developed in GEOE 487. Prerequisite: GEOE 487.

GEOE 491. Geologic Problems. 1-4 Credits.
Individualized or group study on selected geoscience topics. May be taken more than one semester to maximum of 8 hours. Prerequisite: Consent of instructor. Repeatable to 8 credits. F,S,SS.
GEOE 403. Selected Topics in Geological Engineering. 1-3 Credits.
Detailed study of selected topics in Geological Engineering. Includes laboratory if applicable. Repeatable. Repeatable. On demand.

GEOE 494. Senior Thesis. 1 Credit.
Written results of research conducted in Geol 489. The thesis document should conform to the format guidelines of a major English-language journal in which the thesis could be published. A copy is to be provided to the F.D. Holland, Jr. Geology Library. Prerequisite or Corequisite: GEOE 488. F.S.

GEOE Courses

GEOE 203. Earth Dynamics. 3 Credits.
Introductory physical geology course that also includes elements of historical geology, geomorphology, geohazards, and ethics. Intended for engineering and geosciences majors. F.

GEOE 203L. Earth Dynamics Laboratory. 1 Credit.
Laboratory course to accompany Earth Dynamics lecture. The laboratory is delivered as on-campus and virtually using specific required products and digital material. F.

GEOE 210. Earth Dynamics & Geophysics. 4 Credits.
Introduction to geology with an emphasis on those aspects of the science that are essential for petroleum engineers. Topics covered include an introduction to geologic features and processes that are responsible for accumulations of petroleum products in the subsurface. F.

GEOE 301. Petrophysics. 3 Credits.
Mineral and rock formation, identification and petrophysical properties, particularly with respect to porous rocks and their interactions with fluids. Prerequisite: GEOE 203. Corequisite: GEOE 301L. F.

GEOE 301L. Petrophysics Laboratory. 1 Credit.
Laboratory to accompany GEOE 301. Prerequisite: GEOE 203. Corequisite: GEOE 301. F.

GEOE 302. Reclamation Engineering. 3 Credits.
Principles of reclamation emphasizing: the need for reclamation; geology and hydrogeology of disturbed landscapes, geological, hydrological, and ecological reclamation objectives; current reclamation practices; reclamation of abandoned mine lands; reclamation design; laws, regulations, permits, bonds, and public perception. Includes laboratory and field trip. Prerequisite: GEOE 101 or GEOE 203 or consent of instructor. S.

GEOE 323. Engineering Geology. 2 Credits.
This course is to introduce the application of geological, hydrological and environmental principles to geotechnical/geological engineering design, construction and operation as well as various geohazards. Prerequisites: One introductory geology course and MATH 165. S.

GEOE 351. Petroleum Development Engr. 3 Credits.
For qualified students majoring in geological engineering, geology, or environmental geology and technology. A practical work experience with an employer closely associated with the student's academic area. Positions may require student relocation for one or more semesters. Arranged by mutual agreement among student, department, and employer. Special permission required. Repeatable to 24 credits. Repeatable to 24 credits. S/U grading. F.S.SS.

GEOE 412. Soil Mechanics. 3 Credits.
To introduce the student to the fundamental knowledge of geomaterials and mechanical behavior of Soils; to familiarize the student with the use of soil mechanics; to provide the student with a firm foundation for the continuation to more theoretical and applied aspects in pavement engineering, foundation engineering, dam engineering, geological engineering, slope stability and earthquake engineering. Prerequisite: GEOE 323. Prerequisite or Corequisite: ENGR 203. F.

GEOE 417. Hydrogeology. 3 Credits.
Physical and chemical aspects of groundwater movement, supply, and contamination. Prerequisites: CHEM 121 or CHEM 221; MATH 166 or consent of instructor. F.

GEOE 418. Hydrogeological Methods. 2 Credits.
Field and laboratory methods used in hydrogeology; techniques of drilling, well and piezometer installation, determination of aquifer parameters, geophysical exploration, soil classification and analysis, groundwater sampling and analysis. Includes field trip. Prerequisite: GEOE 417. F.

GEOE 419. Groundwater Monitoring and Remediation. 3 Credits.
Statistical methods for groundwater sampling and monitoring network design. Groundwater remediation and design; including strategies that remove contaminants from external treatment and strategies for in-situ contaminant treatment. Prerequisites: MATH 166, GEOE 417 and a statistics course (ECON 210, PSYC 241, MATH 321 or MATH 353) or consent of instructor. S.

GEOE 425. Design Hydrology for Wetlands. 3 Credits.
Principles of chemistry, geology, hydraulics, and hydrology applied to natural and constructed wetlands and other small catchments. Prerequisites: CHEM 121 and either CE 306/ME 306 or GEOE 417. S.

GEOE 427. Groundwater Modeling. 3 Credits.
Fundamentals of numerical modeling applied to groundwater flow. Spreadsheet calculations will be used to demonstrate the finite difference method applied to groundwater movement and storage. Simulation of practical groundwater problems will be performed with the U.S. Geological Survey's MODFLOW code. Prerequisites: GEOE 417 and MATH 265; some programming experience is recommended. On demand.

GEOE 455. Geomechanics. 3 Credits.
The objective of this course is to train the students to use fundamental principles and field and lab techniques of Rock Mechanics to analyze real-world problems, identify the optimal methods, and solve the practical geological engineering problems with the combination of field and laboratory, analytical and experimental means. Emphases will be on the fundamental principles and their application to practical engineering problems, both surface and underground. Prerequisites: GEOE 323 or consent of instructor. F.

GEOE 456. Geomaterials Stabilization. 3 Credits.
The course is to highlight the need for geomaterial improvement and stabilization in engineering. To provide an understanding for the different principles, analysis, design procedures and applications for geomaterial stabilization and ground improvement. Prerequisite: GEOE 355 or equivalent course with instructor's consent. F.

GEOE 484. Geological Engineering Design. 3 Credits.
The first of a two-course sequence in geological engineering design. Define the design problem, establish design objectives, evaluate alternatives, specify constraints, determine a methodology, complete a formal design problem statement. Prerequisites: Advanced level standing in Geological Engineering and consent of advisor. F.

GEOE 485. Geological Engineering Design. 3 Credits.
Continuation of GEOE 484 taken the preceding semester. Systematic study and design, with determination of feasibility, careful assessment of economic factors, safety, reliability, aesthetics, ethics, and social and environmental impact. Results presented in GEOE 422 Seminar. Prerequisite: GEOE 484. Corequisite: GEOE 422. S.

GEOE 493. Selected Topics in Geological Engineering. 1-3 Credits.
Detailed study of selected topics in Geological Engineering. Includes laboratory if applicable. Repeatable. Repeatable. On demand.

GEOL Courses

GEOL 101. Introduction to Geology. 3 Credits.
Introduction to the dynamics of the Earth -- volcanoes, earthquakes, plate tectonics, streams, groundwater, glaciers, waves, wind, and landslides, with emphasis on the environmental applications of these processes. Introduction to the tools of the geologist -- minerals, rocks, maps, and aerial photographs. GEOL 101L may be taken concurrently. F.S.SS.

GEOL 101L. Introduction to Geology Laboratory. 1 Credit.
An introductory laboratory to complement GEOL 101. Field trip(s) included. Prerequisite or Corequisite: GEOL 101. F.S.SS.

GEOL 102. The Earth Through Time. 3 Credits.
The tracing of changes in the Earth and life through time, with emphasis on the record from North America. GEOL 102L may be taken concurrently. F.S.

GEOL 102L. The Earth Through Time Laboratory. 1 Credit.
An introductory laboratory to complement GEOL 102. Field trip included. Prerequisite or Corequisite: GEOL 102. F.S.

GEOL 103. Introduction to Environmental Issues. 3 Credits.
Introduction to Environmental Issues. A survey of environmental issues concerning society's interaction with Earth's natural systems and exploitation of Earth's resources. F.S.
GEOL 104. Geology of National Parks. 3 Credits.
An overview of the geology of U.S. National Parks. Unifying geological principles are emphasized. Major topics: sandstone parks, volcanic parks, hot springs and geothermal areas, caves and limestone parks, reefs and fossilized reefs, rivers and erosion, ice and glaciers, mountain building and mountain ranges. S.

GEOL 105. Selected Topics. 1-4 Credits.
A special topic course intended for non-geology majors. Subjects will include many issues of interest to non-geologists and non-scientists, such as earthquakes, evolution, gems, and the geology of National Parks. Repeatable when topics vary. Repeatable. On demand.

GEOL 106. Global Warming: The Facts and Myths. 3 Credits.
Global warming is the most debated current challenge to humans. A large, multifaceted and technically challenging topic, it has been diluted to popular slogans that at best capture some aspects of the issue and at the worst are over simplifications. Most of us who are directly affected by global warming do not understand the background, do not know what the assertions are based on, and can not evaluate the correctness of the arguments propagated in mass media such as newspapers and talk-radio. This class will provide students with a clear grasp of the science behind global warming discussion, the typical strategies (pros/cons) that are used in the popular media, and a good understanding of the science-based predictions of upcoming changes in the climate and environment In addition to providing general scientific background to understand global warming and the science behind it, the class will visit the arguments that are used both for and against global warming. The graded written tests require students to address typical misinformation about global warming, show general knowledge of the scientific background, and recognize typical means to distort science in the mass media.

GEOL 111. Views of Earth and Planets. 3 Credits.
An introduction to Earth and the Solar System. Coverage includes: the planets and their moons, comets, asteroids, impact craters, meteorites, the sun, the solar system's origin, planetary atmospheres, the living Earth, the question of life elsewhere. F,S.

GEOL 111R. Views of the Earth and Planets Recitation. 1 Credit.
A recitation-discussion to complement GEOL 111. Corequisite: GEOL 111. S.

GEOL 205. Surviving on Planet Earth. 3 Credits.
This Essential Studies course stresses critical thinking in covering the major strategies about humans succeeding on our planet including Earth's hazards (our restless Earth); the balance of life on Earth (evolution and extinction); water in our lives (too much and too little); energy (use and population demands); and global change (Earth as a unique, ongoing experiment). S.

GEOL 220. Computer Applications in Geology and Environmental Science. 2 Credits.
Introduction to the application of computers, software, and digital processing in the geological and environmental sciences. F.

GEOL 256. Critical Thinking in the Geosciences. 2 Credits.
An introduction to the study of geoscience and skills needed to successfully complete a geoscience degree. F.

GEOL 303. Selected Topics in Geology. 1-4 Credits.
Each topic is concerned with a special aspect of geology. May be repeated up to a maximum of 8 hours. Prerequisite: Consent of the instructor. Repeatable to 8 credits. On demand.

GEOL 311. Geomorphology. 4 Credits.
Dynamics of weathering, mass movement, running water, groundwater, waves, wind and ice in the production of landforms. Includes field trips and laboratory. Prerequisites: GEOL 101 or GEODE 203; MATH 165, PHYS 211, CHEM 121 or consent of instructor. F.

GEOL 316. Earth Materials. 4 Credits.
We will organize the course into three Parts: Part I will provide the context in which Earth materials are studied, fundamental concepts that will be used subsequently including: how we study Earth materials, how Earth materials interact with other components of the Earth system, and a rationale for why Earth materials are important for the study of Earth (including processes and history) and the importance of Earth materials in our personal and societal lives. Part II will undertake a systematic look at Earth materials as they occur in different settings. We will identify and describe the key Earth materials, their properties, their distribution and occurrences, the processes that form them, and how scientists use these materials to interpret Earth. Part III will be an investigation of the practical applications of Earth materials to issues of societal importance (e.g., resources, hazards, engineering) and special applications that affect contemporary issues related to living on Earth. This course has both a lecture and a laboratory component. Prerequisites: GEOL 101, GEOL 101L, and CHEM 121 or equivalent. S.

GEOL 318. Mineralogy. 3 Credits.
Survey of the origin, distribution and uses of rock-forming minerals. Introduction to mineral structures, crystal chemistry, and crystallography. Laboratory identification of common minerals in hand sample and petrographic thin section. Introduction to the use of the polarizing microscope. Includes field trip. Prerequisites: GEOL 101 or GEODE 203, and CHEM 121 or consent of instructor. S.

GEOL 320. Petrology. 3 Credits.
Description, classification and origin of igneous, metamorphic, and sedimentary rocks. Field and laboratory study of rocks. Engineering properties of earth materials. Advanced aspects of optical mineralogy. Includes laboratory. Prerequisite: GEOL 318. F.

GEOL 321. Geochemistry. 3 Credits.
Application of the principles of chemistry to geologic and hydrogeologic problems. Origin and distribution of the chemical elements. Introduction to radiochemistry, isotopic geochronology, and stable-isotope geochemistry. Prerequisites: GEOL 318, CHEM 122, and MATH 165 or consent of instructor. S.

GEOL 322. Geology, Society, and the Environment. 3 Credits.
Relationship of geology to society; natural hazards; protection, reclamation, and restoration of our natural environment; application of geology to engineering, land planning, and resource management. Prerequisite: One introductory geology course or upper division standing; MATH 103 is recommended. S, even years.

GEOL 330. Structural Geology. 3 Credits.
Mechanics of rock deformation, analysis of rock structures, preparation and interpretation of geologic maps and cross sections showing structural and tectonic features. Includes laboratory. Prerequisites: GEOL 318, GEOL 320 and MATH 105. S.

GEOL 340. Digital Mapping Methods. 3 Credits.
This course integrates "hands-on" data acquisitions and map generation with an overview of the technology (GPS, lasers, and data management). Field projects focus on mapping methodology and laboratory projects focus on analysis and presentation. It is assumed that students have an undergraduate geology background and a basic knowledge of computer applications. Prerequisite: Junior Standing in geology.

GEOL 342. Conservation and Environmental Hydrology. 3 Credits.
Topics relating hydrology to the environment and water conservation, including the global and local hydrological cycle, flood occurrence and prediction, water pollution, erosion and sedimentation, wetlands, and water management. Prerequisites: Introductory geology course or upper division standing; MATH 103. S, odd years.

GEOL 356. Geoscience Lectures. 1 Credit.
Students attend and evaluate departmental lectures given by visiting scientists and engineers, faculty, and students. May be repeated once. May not be taken concurrently with GEOL 422. S/U grading. F,S.

GEOL 407. Petroleum Geology. 3 Credits.
Origin, accumulation and geologic occurrence of petroleum and gas. Prerequisites: GEOL 101 or GEODE 203, and GEOL 102. F, odd years.

GEOL 410. Site Characterization. 3 Credits.
Purposes, techniques, and tools of site investigation. Covers geologic, hydricologic, and ecologic concerns. Hands-on application of principles, tools and techniques at real sites. Prerequisites: GEOL 220, GEOL 311, GEOL 414; BIOL 332, BIOL 332L. F.
II. The following curriculum:

I. Essential Studies requirements (see University ES listing)

which must be from a 4-year institution) including:

Required 125 credits (36 of which must be numbered 300 or above, and 60 of which must be from a 4-year institution) including:

II. The following curriculum:

GEOL 111. Sedimentology and Stratigraphy. 5 Credits.
Origin, transportation, deposition, and diagenesis of sediments; principles and applications of stratigraphy. Includes field trip and laboratory. Prerequisite: GEOL 320. S.

GEOL 414. Applied Geophysics. 3 Credits.
Principles of various geophysical methods and their application to geologic problems. Prerequisites: GEOL 101 or GECO 203; MATH 165; and PHYS 211 or 251. F.

GEOL 415. Introduction to Paleontology. 4 Credits.
The principles of paleontology/paleobiology are presented using fossils to document the evolutionary, stratigraphic, and paleoecologic history of animal and plant life on Earth. Includes field trip and laboratory. Prerequisites: GEOL 162; BIOL 150 and BIOL 151 are recommended prerequisites. F, even years.

GEOL 420. Geology Capstone. 3 Credits.
Geology capstone entailing information literacy and communication about Earth materials, processes and history. The course checks retention of earlier learning and insures review and significant addition to that learning. Prerequisite: GEOL 487. Corequisite: GEOL 494. F.S.

GEOL 421. Seminar I. 1 Credit.
Instruction and practice of oral and visual presentation in science and engineering. Includes preparation and delivery of oral presentations in science and engineering, culminating in oral presentation of senior thesis (Geol 490) or Engineering Design (485). Includes critical review of student presentations and departmental guest lectures. Prerequisite: GEOL 356. F.S.

GEOL 422. Seminar II. 1 Credit.
Continuation of GEOL 421 experience. Preparation and delivery of oral presentations in science and engineering, culminating in oral presentation of senior thesis (Geol 490) or Engineering Design (485). Includes critical review of student presentations and departmental guest lectures. Prerequisites: GEOL 421, senior or graduate status in departmental major. F.S.

GEOL 487. Research I. 1 Credit.
Identification and proposal of research project. Includes literature review, feasibility review, and formal project identification and written proposal. Selection of faculty research adviser within first month of semester. Prerequisite: Senior standing in departmental major. F.S.

GEOL 488. Research II. 2 Credits.
Execution of research plan developed in GEOL 487. Prerequisite: GEOL 487.

GEOL 491. Geologic Problems. 1-4 Credits.
Individualized or group study on selected geoscience topics. May be taken more than one semester to maximum of 8 hours. Prerequisite: Consent of instructor. Repeatable to 8 credits. F.S,SS.

GEOL 494. Senior Thesis. 1 Credit.
Written results of research conducted in Geol 489. The thesis document should conform to the format guidelines of a major English-language journal in which the thesis could be published. A copy is to be provided to the F.D. Holland, Jr. Geology Library. Prerequisite or Corequisite: GEOL 488. F.S.

Bachelor of Science in Earth Science

Required 125 credits (36 of which must be numbered 300 or above, and 60 of which must be from a 4-year institution) including:

I. Essential Studies requirements (see University ES listing)

II. The following curriculum:

Major hours

GEOL 101 & 101L Introduction to Geology and Introduction to Geology Laboratory 4
GEOL 102 & 102L The Earth Through Time and The Earth Through Time Laboratory 4
GEOL 256 Critical Thinking in the Geosciences 2
GEOL 311 Geomorphology 4
GEOL 318 Mineralogy 3
GEOL 320 Petrology 3
GEOL 330 Structural Geology 3
GEOL 356 Geoscience Lectures 2
GEOL 420 Geology Capstone 3
GEOL 422 Seminar II 1
Geology Electives (300 level and above) 13
Required in other departments
Computer Science and/or Statistics 8
CHEM 121 General Chemistry I 8
& 121L and General Chemistry I Laboratory
& CHEM 122 General Chemistry II 8
& CHEM 122L General Chemistry II Laboratory
MATH 103 College Algebra 3
MATH 105 Trigonometry 2
PHYS 211 College Physics I 8
& PHYS 211L and College Physics II
& PHYS 212L and

Select one of the following: 22
Level IV proficiency in a foreign language and six hours of Social Sciences and Arts and Humanities beyond the University requirement
Level II proficiency in a foreign language and 14 hours of Social Sciences and Arts and Humanities beyond the University requirement
Social Sciences and Arts and Humanities beyond the University requirement
Nonspecified electives approved by adviser 7
Total Credits 100

Bachelor of Science in Environmental Geoscience

The B.S. in Environmental Geoscience, administered by the College of Engineering and Mines, combines a broad foundation in geology with a thorough background in related sciences and mathematics. This degree provides the graduate with more applied and interdisciplinary science skills than the Geology B.S. or B.A. Although not an engineering degree, graduates with a B.S. in Environmental Geoscience are qualified to work in various environmental fields, including field monitoring, remediation of contaminated sites, evaluation of natural hazards, site selection, waste disposal, and water resources. Continuing at the graduate level at UND or other institutions is another option, with opportunities to branch into fields such as geography, ecology, hydrology, and environmental policy. The program includes electives in biology, chemistry, geological engineering, law, and Earth system science. Completion of a summer geology field course, although strongly recommended, is not required for graduation.

Required 125 credits, including:

I. Essential Studies Requirements (see University ES listing).

II. The following Core Curriculum:

41 major hours including:

GEOL 101 & 101L Introduction to Geology and Introduction to Geology Laboratory 4
Or
GEOE 203 Earth Dynamics 4
& 203L and Earth Dynamics Laboratory
GEOL 103 Introduction to Environmental Issues 3
GEOL 220 Computer Applications in Geology and Environmental Science 2
GEOL 256 Critical Thinking in the Geosciences 2
GEOL 311 Geomorphology 4
GEOL 318 Mineralogy 3
GEOL 321 Geochemistry 3
GEOL 322 Geology, Society, and the Environment 3
GEOL 342 Conservation and Environmental Hydrology 3
GEOL 356 Geoscience Lectures 1
GEOL 414 Applied Geophysics 3
GEOL 420 Geology Capstone 3

Total Credits 100
Bachelor of Science in Geological Engineering

Required: 128 credits including:

I. Essential Studies Requirements (see University ES listing).

II. The following curriculum:

All students must meet each semester with their academic advisor.

Freshman Year

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MATH 165</td>
<td>Calculus I</td>
</tr>
<tr>
<td>CHEM 121</td>
<td>General Chemistry I &amp; 121L and General Chemistry I Laboratory</td>
</tr>
<tr>
<td>ENGL 110</td>
<td>College Composition I</td>
</tr>
<tr>
<td>GEEO 203</td>
<td>Earth Dynamics &amp; 203L and Earth Dynamics Laboratory</td>
</tr>
<tr>
<td>ENGR 200</td>
<td>Computer Applications in Engineering</td>
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</table>

Credits 17

Second Semester

| ENGR 201       | Statics | 3 |
| MATH 166       | Calculus II | 4 |
| GEEO 301       | Petrophysics & 301L and Petrophysics Laboratory | 4 |

Credits 7

Sophomore Year

<table>
<thead>
<tr>
<th>First Semester</th>
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<tbody>
<tr>
<td>MATH 265</td>
<td>Calculus III</td>
</tr>
<tr>
<td>PHYS 252</td>
<td>University Physics II &amp; PHYS 252L and</td>
</tr>
<tr>
<td>CHEM 122</td>
<td>General Chemistry II &amp; 122L and General Chemistry II Laboratory</td>
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<tr>
<td>ME 341</td>
<td>Thermodynamics</td>
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Credits 15

<table>
<thead>
<tr>
<th>Second Semester</th>
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<tbody>
<tr>
<td>ENGR 203</td>
<td>Mechanics of Materials</td>
</tr>
<tr>
<td>EE 206 or ENGR 202</td>
<td>Circuit Analysis or Dynamics</td>
</tr>
<tr>
<td>MATH 266</td>
<td>Elementary Differential Equations</td>
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Credits 15

Junior Year

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<th>First Semester</th>
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<tbody>
<tr>
<td>GEEO 417</td>
<td>Hydrogeology</td>
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<tr>
<td>Arts &amp; Humanities Elective</td>
<td>3</td>
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<tr>
<td>ECON 210 or MATH 321</td>
<td>Introduction to Business and Economic Statistics (Statistics Elective) or Applied Statistical Methods</td>
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Credits 15

<table>
<thead>
<tr>
<th>Second Semester</th>
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<tbody>
<tr>
<td>ENGL 411</td>
<td>Sedimentology and Stratigraphy</td>
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<tr>
<td>GEEO 323</td>
<td>Engineering Geology</td>
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<tr>
<td>Technical Elective</td>
<td>3</td>
</tr>
<tr>
<td>Communication Elective</td>
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</table>

Credits 14-15

Summer

Geological Engineering Field Camp (South Dakota School of Mines and Technology Black Hills Field Camp) | 6 |

Credits 6

Senior Year

<table>
<thead>
<tr>
<th>First Semester</th>
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<tbody>
<tr>
<td>GEEO 414</td>
<td>Applied Geophysics</td>
</tr>
<tr>
<td>GEEO 455 &amp; 455L</td>
<td>Geomechanics and Geomechanics Laboratory</td>
</tr>
<tr>
<td>GEEO 484</td>
<td>Geological Engineering Design</td>
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<tr>
<td>Social Science Elective</td>
<td>3</td>
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<td>Technical Elective</td>
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Credits 15-16

<table>
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<tr>
<th>Second Semester</th>
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<tbody>
<tr>
<td>CHE 340 or PHIL 250</td>
<td>Ethics in Engineering and Science</td>
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<tr>
<td>GEEO 485</td>
<td>Geological Engineering Design</td>
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<tr>
<td>Technical Elective</td>
<td>3</td>
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<tr>
<td>GEOL 422</td>
<td>Seminar II</td>
</tr>
<tr>
<td>Arts and Humanities Elective</td>
<td>3</td>
</tr>
<tr>
<td>Arts and Humanities or Social Science Elective</td>
<td>3</td>
</tr>
</tbody>
</table>

Credits 16

Total Credits 128-130
Technical Electives: 8 credits required from courses approved by Geological Engineering Curriculum Committee.

Students may substitute Geology lecture series (GEOL 356 Geoscience Lectures, GEOL 421 Seminar I, GEOL 422 Seminar II) with COMM 110 Fundamentals of Public Speaking (ES=O)

**Approved Technical Electives for Geological Engineering**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CE 414</td>
<td>Foundation Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CE 421</td>
<td>Hydrology</td>
<td>3</td>
</tr>
<tr>
<td>CE 431</td>
<td>Environmental Engineering I</td>
<td>3</td>
</tr>
<tr>
<td>CE 432</td>
<td>Environmental Engineering II</td>
<td>3</td>
</tr>
<tr>
<td>GEOE 302</td>
<td>Reclamation Engineering</td>
<td>3</td>
</tr>
<tr>
<td>GEOE 351</td>
<td>Petroleum Development Engr</td>
<td>3</td>
</tr>
<tr>
<td>GEOE 418</td>
<td>Hydrogeological Methods</td>
<td>2</td>
</tr>
<tr>
<td>GEOE 419</td>
<td>Groundwater Monitoring and Remediation</td>
<td>3</td>
</tr>
<tr>
<td>GEOE 425</td>
<td>Design Hydrology for Wetlands</td>
<td>3</td>
</tr>
<tr>
<td>GEOE 427</td>
<td>Groundwater Modeling</td>
<td>3</td>
</tr>
<tr>
<td>GEOE 493</td>
<td>Selected Topics in Geological Engineering</td>
<td>1-3</td>
</tr>
<tr>
<td>GEOL 311</td>
<td>Geomorphology</td>
<td>4</td>
</tr>
<tr>
<td>GEOL 321</td>
<td>Geochemistry</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 407</td>
<td>Petroleum Geology</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 491</td>
<td>Geologic Problems (only section)</td>
<td>1-4</td>
</tr>
<tr>
<td>PTRE 311</td>
<td>Petroleum Fluid Properties</td>
<td>3</td>
</tr>
<tr>
<td>PTRE 401</td>
<td>Well Logging</td>
<td>3</td>
</tr>
<tr>
<td>PTRE 411</td>
<td>Drilling Engineering</td>
<td>3</td>
</tr>
<tr>
<td>PTRE 421</td>
<td>Production Engineering</td>
<td>3</td>
</tr>
<tr>
<td>PTRE 431</td>
<td>Reservoir Engineering</td>
<td>3</td>
</tr>
</tbody>
</table>

Students may petition the Geological Engineering Curriculum Committee (GECC) to use GEOE 397 Cooperative Education, for up to three credits of technical elective credits with the following requirement:

1. Students must get approval in advance from the GECC and the Department Cooperative Coordinator.
2. The first cooperative experience may receive up to one credit of technical elective credit.
3. The second cooperative experience may receive up to two credits of technical elective credit.

**Petroleum Option**

The program has a petroleum option, which is designed to prepare students for possible employment in the petroleum industry, while continuing to provide a broad geological engineering background for career flexibility. The graduate pursuing this emphasis will have a B.S. in Geological Engineering and can report that they have completed the petroleum engineering option requirements.

**Bachelor of Science in Geology**

Required 125 credits (36 of which must be numbered 300 or above, and 60 of which must be from a 4-year institution) including:

I. Essential Studies requirements (see University ES listing).

II. The following curriculum:

**Major hours**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOL 101</td>
<td>Introduction to Geology</td>
<td>4</td>
</tr>
<tr>
<td>&amp; 101L</td>
<td>and Introduction to Geology Laboratory</td>
<td></td>
</tr>
<tr>
<td>GEOL 102</td>
<td>The Earth Through Time</td>
<td>4</td>
</tr>
<tr>
<td>&amp; 102L</td>
<td>and The Earth Through Time Laboratory</td>
<td></td>
</tr>
<tr>
<td>GEOL 256</td>
<td>Critical Thinking in the Geosciences</td>
<td>2</td>
</tr>
<tr>
<td>GEOL 311</td>
<td>Geomorphology</td>
<td>4</td>
</tr>
<tr>
<td>GEOL 318</td>
<td>Mineralogy</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 320</td>
<td>Petrology</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 330</td>
<td>Structural Geology</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 356</td>
<td>Geoscience Lectures</td>
<td>1</td>
</tr>
<tr>
<td>GEOL 411</td>
<td>Sedimentology and Stratigraphy</td>
<td>5</td>
</tr>
<tr>
<td>GEOL 420</td>
<td>Geology Capstone</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 421</td>
<td>Seminar I</td>
<td>1</td>
</tr>
<tr>
<td>GEOL 422</td>
<td>Seminar II</td>
<td>1</td>
</tr>
<tr>
<td>GEOL 487</td>
<td>Research I</td>
<td>1</td>
</tr>
<tr>
<td>GEOL 488</td>
<td>Research II</td>
<td>2</td>
</tr>
<tr>
<td>GEOL 494</td>
<td>Senior Thesis</td>
<td>1</td>
</tr>
</tbody>
</table>

Field Geology (Summer; not available at UND) | 6 |

Select two of the following: | 6-7 |
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>GEOL 321</td>
<td>Geochemistry</td>
</tr>
<tr>
<td>GEOL 414</td>
<td>Applied Geophysics</td>
</tr>
<tr>
<td>GEOL 415</td>
<td>Introduction to Paleontology</td>
</tr>
<tr>
<td>GEOE 417</td>
<td>Hydrogeology</td>
</tr>
</tbody>
</table>

**Required in other departments**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 121</td>
<td>General Chemistry I</td>
<td>8</td>
</tr>
<tr>
<td>&amp; 121L</td>
<td>and General Chemistry I Laboratory</td>
<td></td>
</tr>
<tr>
<td>&amp; CHEM 122</td>
<td>General Chemistry II</td>
<td></td>
</tr>
<tr>
<td>&amp; CHEM 122L</td>
<td>and General Chemistry II Laboratory</td>
<td></td>
</tr>
<tr>
<td>ENGL 110</td>
<td>College Composition I</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 130</td>
<td>Composition II: Writing for Public Audiences</td>
<td>3</td>
</tr>
<tr>
<td>MATH 165</td>
<td>Calculus I</td>
<td>8</td>
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<tr>
<td>&amp; MATH 166</td>
<td>and Calculus II</td>
<td></td>
</tr>
<tr>
<td>PHYS 211</td>
<td>College Physics I</td>
<td>4</td>
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<tr>
<td>&amp; PHYS 211L</td>
<td>and University Physics I</td>
<td></td>
</tr>
<tr>
<td>PHYS 212</td>
<td>College Physics II</td>
<td>4</td>
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<tr>
<td>&amp; PHYS 212L</td>
<td>and University Physics II</td>
<td></td>
</tr>
<tr>
<td>&amp; PHYS 251</td>
<td>and General Chemistry II Laboratory</td>
<td></td>
</tr>
<tr>
<td>&amp; PHYS 252</td>
<td>and General Chemistry II Laboratory</td>
<td></td>
</tr>
<tr>
<td>&amp; PHYS 252L</td>
<td>and General Chemistry II Laboratory</td>
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</tr>
<tr>
<td>GEOL 493</td>
<td>Selected Topics in Geological Engineering</td>
<td>1-3</td>
</tr>
</tbody>
</table>

Select one of the following: | 8 |
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>MATH 265</td>
<td>Calculus III</td>
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<tr>
<td>MATH 321</td>
<td>Applied Statistical Methods</td>
</tr>
<tr>
<td>PSYC 241</td>
<td>Introduction to Statistics</td>
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</tbody>
</table>

Departmentally approved courses in engineering, mathematics, foreign language, and other fields of student interest 22-24

**Concentration in Petroleum Geology**

Geology is a critically important discipline in the exploration for and extraction of petroleum. These activities require skills in visualizing and understanding the sedimentary rocks especially those in the subsurface. The range of typical applications is wide and the methods used are diverse. Expertise provided by this concentration include aspects of sedimentary geology, stratigraphy, structural geology and geophysics. This expertise is highly sought after by industries and government agencies that find and produce the oil that fuels today's economies. Furthermore, it has become equally important to train replacements for an aging workforce in this important technological area. The concentration in Petroleum Geology is designed to prepare students for careers as petroleum geologists.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOL 407</td>
<td>Petroleum Geology</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 415</td>
<td>Introduction to Paleontology</td>
<td>4</td>
</tr>
<tr>
<td>GEOL 491</td>
<td>Geologic Problems (special projects in petroleum geology)</td>
<td>4</td>
</tr>
<tr>
<td>GEOL 356</td>
<td>Geoscience Lectures</td>
<td>1</td>
</tr>
<tr>
<td>GEOL 500</td>
<td>Sedimentary Geology</td>
<td>3</td>
</tr>
<tr>
<td>PTRE 401</td>
<td>Well Logging</td>
<td>3</td>
</tr>
<tr>
<td>or PTRE 401B</td>
<td>Well Logging</td>
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</tbody>
</table>

Bachelor of Science in Geology

Required 125 credits (36 of which must be numbered 300 or above, and 60 of which must be from a 4-year institution) including:

I. Essential Studies requirements (see University ES listing).

II. The following curriculum:

**Major hours**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>GEOL 101</td>
<td>Introduction to Geology</td>
<td>4</td>
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<tr>
<td>&amp; 101L</td>
<td>and Introduction to Geology Laboratory</td>
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<tr>
<td>GEOL 102</td>
<td>The Earth Through Time</td>
<td>4</td>
</tr>
<tr>
<td>&amp; 102L</td>
<td>and The Earth Through Time Laboratory</td>
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<tr>
<td>GEOL 256</td>
<td>Critical Thinking in the Geosciences</td>
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<td>GEOL 311</td>
<td>Geomorphology</td>
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<td>GEOL 318</td>
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<td>Seminar I</td>
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<td>GEOL 422</td>
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<td>GEOL 487</td>
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<td>Research II</td>
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<td>GEOL 494</td>
<td>Senior Thesis</td>
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</table>

Field Geology (Summer; not available at UND) | 6 |

Select two of the following: | 6-7 |
<table>
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<td>Hydrogeology</td>
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<td>and General Chemistry I Laboratory</td>
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<tr>
<td>&amp; CHEM 122</td>
<td>General Chemistry II</td>
<td></td>
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<tr>
<td>&amp; CHEM 122L</td>
<td>and General Chemistry II Laboratory</td>
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<tr>
<td>ENGL 110</td>
<td>College Composition I</td>
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<tr>
<td>ENGL 130</td>
<td>Composition II: Writing for Public Audiences</td>
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<td>MATH 165</td>
<td>Calculus I</td>
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<td>&amp; MATH 166</td>
<td>and Calculus II</td>
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<td>PHYS 211</td>
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<td>and University Physics I</td>
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<tr>
<td>PHYS 251</td>
<td>and General Chemistry II Laboratory</td>
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<tr>
<td>GEOL 493</td>
<td>Selected Topics in Geological Engineering</td>
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Select one of the following: | 8 |
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<tr>
<td>MATH 265</td>
<td>Calculus III</td>
</tr>
<tr>
<td>MATH 321</td>
<td>Applied Statistical Methods</td>
</tr>
<tr>
<td>PSYC 241</td>
<td>Introduction to Statistics</td>
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</table>

Departmentally approved courses in engineering, mathematics, foreign language, and other fields of student interest 22-24

**Concentration in Petroleum Geology**

Geology is a critically important discipline in the exploration for and extraction of petroleum. These activities require skills in visualizing and understanding the sedimentary rocks especially those in the subsurface. The range of typical applications is wide and the methods used are diverse. Expertise provided by this concentration include aspects of sedimentary geology, stratigraphy, structural geology and geophysics. This expertise is highly sought after by industries and government agencies that find and produce the oil that fuels today's economies. Furthermore, it has become equally important to train replacements for an aging workforce in this important technological area. The concentration in Petroleum Geology is designed to prepare students for careers as petroleum geologists.
Teacher Certification (p. 124)

Students seeking secondary teacher certification in Geology must complete the Department of Teaching and Learning Requirements in Secondary Education. Students seeking certification should follow the curriculum for the B.S. in Geology and select Statistics (PSYC 241 Introduction to Statistics, MATH 321 Applied Statistical Methods) rather than MATH 265 Calculus III or Computer Science. The 24 additional hours in science, computer science, statistics, engineering, mathematics, or a foreign language must include each of the following: at least one course in Biology with lab equaling 4 credits, Atmospheric Sciences, and Astronomy.

Geology majors seeking secondary certification must have an adviser both in the Department of Geology and Geological Engineering and in the Department of Teaching and Learning. Formal admission to Teacher Education is required and is normally sought while the student is enrolled in T&L 250 Introduction to Education (see Department of Teaching and Learning listing).

Minor in Geology

Required: 20 credits including:

Select two of the following: 7-8

<table>
<thead>
<tr>
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<tr>
<td>GEOL 101</td>
<td>Introduction to Geology</td>
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<tr>
<td>101L</td>
<td>and Introduction to Geology Laboratory</td>
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<tr>
<td>or GEOE 203</td>
<td>Earth Dynamics</td>
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<tr>
<td>GEOL 102</td>
<td>The Earth Through Time</td>
</tr>
<tr>
<td>102L</td>
<td>and The Earth Through Time Laboratory</td>
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Select two of the following: 6

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<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>GEOL 103</td>
<td>Introduction to Environmental Issues</td>
</tr>
<tr>
<td>GEOL 111</td>
<td>Views of Earth and Planets</td>
</tr>
<tr>
<td>GEOL 311</td>
<td>Geomorphology</td>
</tr>
<tr>
<td>GEOL 322</td>
<td>Geology, Society, and the Environment</td>
</tr>
</tbody>
</table>

Remaining electives chosen from Geology courses numbered 300 or higher, not including 303 7

Total Credits 20-21

History (Hist)

B.A. with Major in History (p. 124)
HIST 220. History of North Dakota. 3 Credits.
A survey emphasizing settlement and development, noting the consequences of the state's location, climate, and settlers on the situation in which it now finds itself. Special attention is paid to the Nonpartisan League story and the evolution of isolationist sentiment among North Dakotans. Recommended for Social Science major certification. F.S.

HIST 230. A Cultural History of Science and Technology. 3 Credits.
This course examines the evolution of modern science and technology from the Renaissance through the present day, focusing on the relationship between how cultures describe the natural world and develop the tools needed to manipulate it. The course will investigate how and why science and technology have acquired their privileged places in modern society, their crucial roles in the development of economic and military power, and in our construction of human social, racial, and gender difference. S.

HIST 240. The Historian's Craft. 3 Credits.
An introduction to research and writing history. Students will learn critical reading of secondary sources, how to locate and evaluate resources, how to analyze evidence, how to apply the style and form of historical writing, and how to utilize methods of research. Students will also study historiography and types of historical writing and practice. F.S.

HIST 250. The Civil Rights Movement. 3 Credits.
This course examines the "long" Civil Rights Movement, surveying not only the well-known struggles of the 1954-1965 period, but also significant episodes that came before and after that famous era. Along the way, the class explores contemporaries' accounts of the movement, how the crusade has been portrayed over the years, how Americans remember the saga nowadays, and civil rights today. S, odd years.

HIST 253. History of Stuff. 3 Credits.
What do your belongings say about you? Learn to interpret historic objects from ancient tools to modern toys and trash. Research, write and publish your findings online. S, odd years.

HIST 260. Slaves, Citizens and Social Change. 3 Credits.
Through intense role playing and a highly interactive learning environment, students in this course explore key historic debates in American history about slavery, capitalism, citizenship, and women's roles. Class sessions are student-centered and directed, while professors advise, guide and evaluate oral and written work. On demand.

HIST 269. World War II. 3 Credits.
A brief survey of the background, strategy and major campaigns of World War II including some of the diplomatic and political problems encountered by the major belligerents. The course includes extensive use of documentary film. S, odd years.

HIST 300. Topics in History. 1 Credit.
Topics in history which allow the student to study a specialized subject. 4 credits may apply to the history minor; 6 credits to the history major. Repeatable to 6 credits. Repeatable to 6 credits. F.S.

HIST 301. The Medieval World. 3 Credits.
A survey of the people, cultures, and history of the European middle ages, from the late Roman Empire to the Renaissance. The course will focus on the lives and thoughts of medieval women and men from all social classes and on the foundations of European culture, society, politics, and worldview. Specific topics will include the Crusades, the Black Death, crime and punishment, daily life, war and violence, and religious life. On demand.

HIST 304. The Holocaust. 3 Credits.
This course is an in-depth exploration of why and how one of the worst genocides in human history happened. It is discussion-oriented and uses readings to explore the perspectives of victims, perpetrators, and bystanders, as well as how different groups in our 21st-century world today remember the event. F, even years.

HIST 305. Revolution, Protest, and Freedom. 3 Credits.
This course explores how ordinary people have used protest and revolution to promote ideas about freedom in the 20th century. It focuses on non-elites inside and outside of Europe's borders by examining the actions of women, colonial peoples, and the working classes. While it focuses on Europe the course incorporates a global view of how to understand protest and revolutionary social change. F, odd years.

HIST 310. Monuments, Museums and Memory. 3 Credits.
How should we remember our history? How do museums and public monuments influence our understanding of the past? Explore these questions through case studies and extended role-playing games. On demand.

HIST 325. American West. 3 Credits.
Explores the lives of diverse peoples living in western North America from the 16th century to the present. Topics include migrations, intercultural interactions, environmental change, and the West in popular culture. On demand.

HIST 327. France and Empire. 3 Credits.
This course will explore the development of modern French history from 1789-present. French history is highly contentious, characterized by revolution, imperialism, and a variety of marginalized groups fighting for rights as full citizens. The course is organized chronologically and themes will include politics, empire, society, and culture. F, odd years.

HIST 328. Human Rights. 3 Credits.
This course will explore how the concept of human rights developed throughout the world from the 18th century to today. Topics will include debates over what human rights are and when they originated, how people throughout the world have used the concept for their own ends, and why it is a controversial subject today. S, even years.

HIST 330. The United States: Social and Cultural, 19th Century. 3 Credits.
A survey of the contributions of social institutions (such as the family, school, and church) to the development of a national culture. The colonial background is considered briefly, but emphasis is given to the first half of the nineteenth century. Changing attitudes toward social reform, intellectualism, class status, and minorities (such as children, women, blacks, and Indians) are examined. Competing regional trends in economics, social, political, and intellectual attitudes and institutions provide the dynamics for understanding the failure of nationalism during the antebellum period. On demand.

HIST 332. Women in Early America. 3 Credits.
How did women experience and shape American history and the United States as we know it today? This course explores the social, political, and economic lives of women from diverse cultural backgrounds in colonial America and the early United States. Using gender, race, class, and culture as analytical lenses reveals the struggles and victories of women, as well as their individual and collective influence on the broader society. F, odd years.

HIST 333. Women in Modern America. 3 Credits.
How did women experience and shape American history and the United States as we know it today? This course explores the social, political, and economic lives of American women from diverse cultural backgrounds from the rise of the "New Woman" in the late 19th century to the present. Using gender, race, class, and culture as analytical lenses reveals the struggles and victories of women, as well as their individual and collective influence on the broader society. S, even years.

HIST 335. Nuclear Weapons and the Modern Age. 3 Credits.
An introduction to the history of nuclear weapons and their delivery systems, their development and use during World War II, the nuclear arms race between the U.S. and the U.S.S.R., popular disarmament movements, and diplomatic efforts to control nuclear weapons and their proliferation. A final section will deal with the nuclear implications of the end of the Cold War and the development of new nuclear states in the last years of the 20th century. The course will include—from an historian's point of view—some technical material necessary to a reasonable and realistic understanding of the subject. S, even years.

HIST 339. The United States and Vietnam, 1945-1975. 3 Credits.
An exploration of Southeast Asian as well as American history. This course will survey briefly the development of Vietnamese culture and nationalism, the history of French imperialism in Indochina as background to an examination of the development of the Vietnamese independence movement, the origins of Vietnamese communism, the war for independence from France, and the violent and tragic relationship between the U.S. and Vietnam from the end of World War II to the final departure of American forces from Saigon. S, even years.

HIST 343. Ancient Greece. 3 Credits.
A study of Greek prehistory and history to the end of the Hellenistic era. Greek achievements in art, commerce, literature, politics, religion, science, and technology are surveyed. F, odd years.

HIST 344. Ancient Rome. 3 Credits.
A survey of the prehistory, historical development, and ultimate decline in Rome. In addition to inquiries into the military, political, cultural, economic, and religious experiences of the ancient Romans, this course will attempt to delineate those qualities of life that were peculiarly Roman. S, even years.
HIST 345. The Ancient Near East. 3 Credits.
A course intended to acquaint the student with cultures of the ancient
western Asian world. Egypt, Iran, Iraq, Turkey, and the Levant are the areas
emphasized. S. even years.

HIST 347. Seminar. 3 Credits.
This class reinforces the skills introduced in HIST 240 through intensive
student-centered approach to the study of the past. The class centers upon
refining individual skills in informational literacy, critical thinking and both written
and oral communication through a series of focused readings, discussions and
projects. Prerequisite: HIST 240. F.S.

HIST 349. The Origins of Modern War. 3 Credits.
The course examines the military, social and technological developments that
lead to the emergence of the modern way of war in the nineteenth century, from
the advent of firearms and professional armies at the end of the middle ages,
through the "Gunpowder Revolution" and the rise of the nation state, to the
foundations of European global military dominance and the "nation at war" of
the French Revolution and Napoleon. F. odd years.

HIST 350. The Renaissance and Reformations: Europe 1450-1600. 3
Credits.
An introduction to the cultural and political history of Europe from the
Renaissance of the late Middle Ages through the religious upheavals of the
16th century. The course will focus on the emergence of new worldviews
during the Early Modern Era and the accompanying religious, social, and
political transformation of Western culture. Topics will include European global
exploration and expansion, the Protestant and Catholic Reformations, and the
growth of a new understanding of our place in the cosmos. On demand.

HIST 351. Kings, Witches, Science and War: Europe and the Search for
a New Order. 3 Credits.
Kings, Witches, Science and War: Europe and the Search for a New Order.
Through a survey of Europe in the eighteenth century, the course explores the
fascinating contradictions of the age. The era saw the emergence of modern
science and the greatest witch trials; its people endured Europe's most savage
religious wars but took the first steps towards religious toleration; it was an
age still grounded in ancient tradition, but which also saw the birth of modern
political, social, military and economic systems. On demand.

HIST 352. Enlightenment and Revolution: Europe 1700-1800. 3 Credits.
The "Age of Reason" can be seen as a time of aristocratic privilege and
refinement in the courts of absolute kings, but was also a time or revolution,
social upheaval and emergent democracy. The course focuses upon the
social, political, and intellectual development of Europe during the eighteenth
to; topics include the Enlightenment, Europe's first global wars, slavery
and colonialism, the French Revolution and the advent of Napoleon Bonaparte.
On demand.

HIST 353. Europe in the Nineteenth Century, 1815-1918. 3 Credits.
Europe was transformed by industrial and scientific achievements in the
19th century. People in many European countries saw their capacities in
transportation, communication, production, manufacture, and weaponry
multiplied many times over. The accumulated energy generated by these
achievements was released in the Great War 1914-1918, which ended
Europe's domination of the world. On demand.

HIST 355. Europe since 1918. 3 Credits.
When the 20th century began, Europe was the acknowledged center of the
world. But 400 years of European global supremacy ended with the Great War
1914-1918. Its aftermath was marked by the greatest tragedies in human
history. Following the even more global and more terrible Second World War, European nations created the European Union. Can the EU withstand the
pressures to which it is being subjected? On demand.

HIST 362. Modern China. 3 Credits.
A survey of the political, economic, social, and intellectual history of China
from the Opium War (1842) until the present. Special attention will be paid
to the problems of modernization in traditional societies and to the nature of
fundamental social revolution.

HIST 370. African-American History to 1877. 3 Credits.
This course begins with an examination of when and why the idea of race
first developed; it then surveys colonial slavery, the impact of the American
Revolution on race relations, and the slave community during the antebellum
period. We also consider the lives of free blacks in the North and South, as well
as the similarities and differences between U.S. and Latin American slavery.
The course concludes with a detailed look at Reconstruction, this nation's
experiment in interracial democracy. Through lecture, discussion, projects, and
writing assignments, History 370 highlights both the tribulations and triumphs of
African Americans. F.

HIST 371. African-American History since 1877. 3 Credits.
This course begins with a brief overview of Reconstruction; it then examines
Populism, the entrenchment of Jim Crow segregation, and the philosophies
of Booker T. Washington and W.E.B. DuBois. We also explore the impact
of World War I on African Americans, as well as the Great Migration, the
Harlem Renaissance, and the Great Depression/World War II era. Several
weeks are devoted to the Civil Rights and Black Power Movements, and
the course concludes with an examination of contemporary race relations.
A mixture of lectures, discussion, projects, and writing assignments, History
371 emphasizes both the travails and triumphs of African Americans since
1877, and endeavors to discover(and cultivate) the forces which promote racial
equality and social justice. S.

HIST 379. The Invention of Latin American. 3 Credits.
This course explores Latin America's history from the start of the Atlantic Slave Trade
to the present. The class explores how both internal and external forces shaped
Latin America's history and pays particular attention to the current opportunities and
issues within Modern Africa. S. odd years.

HIST 381. Modern Africa. 3 Credits.
This course explores Africa's history from the start of the Atlantic Slave Trade
to the present. The class explores how both internal and external forces shaped
Africa's history and pays particular attention to the current opportunities and
issues within Modern Africa. S. odd years.

HIST 382. From Pharaohs to Phantasms. 3 Credits.
A practical work experience with an employer closely associated with the
student's academic area. 3 credits repeatable to 9. Arranged by mutual
agreement among student, department, and employer. May be repeated to a
maximum of 9 credits. Repeatable to 9 credits. S/U grading. F.S.SS.

HIST 391. The Invention of Latin American. 3 Credits.
A practical work experience with an employer closely associated with the
student's academic area. 3 credits repeatable to 9. Arranged by mutual
agreement among student, department, and employer. May be repeated to a
maximum of 9 credits. Repeatable to 9 credits. S/U grading. F.S.SS.

HIST 392. 'A Motley Rabble...'. 3 Credits.
This course explores the rise of a 'Motley Rabble' colonial peoples who John
Adams, in 1770, blamed for the Boston Massacre. It explores the people who
freely and unfreely came to British North America, their interactions with the
peoples they encountered, and the world that they created. It ends by exploring
how this 'Motley Rabble' gained their independence. On demand.

HIST 393. The United States: Age of Jefferson and Jackson, 1789-1850. 3
Credits.
A study of the creation of a new, expansive nationalism in the development of
new institutions and new national character, and the simultaneous growth of
sectional forces which brought the new nation to the brink of Civil War. F.

HIST 394. The United States: Civil War and Reconstruction, 1850-1877. 3
Credits.
A study of the acceleration of the forces of sectionalism and racism that caused
Civil War and Reconstruction. S, odd years.

HIST 395. The United States: Age of Jefferson and Jackson, 1789-1850. 3
Credits.
A study of the creation of a new, expansive nationalism in the development of
new institutions and new national character, and the simultaneous growth of
sectional forces which brought the new nation to the brink of Civil War. F.

HIST 396. The United States: Civil War and Reconstruction, 1850-1877. 3
Credits.
A survey of the rise of America to industrial and world power. Emphasis is
placed upon the great changes which the Industrial Revolution brought and the
American response to these changes. Detailed attention is given to the Populist
and Progressive movements. F. odd years.

HIST 397. Cooperative Education. 3 Credits.
A practical work experience with an employer closely associated with the
student's academic area. 3 credits repeatable to 9. Arranged by mutual
agreement among student, department, and employer. May be repeated to a
maximum of 9 credits. Repeatable to 9 credits. S/U grading. F.S.SS.

HIST 399. Selected Topics in History. 1-3 Credits.
Selected topics in history which allow the student to study a specialized subject.
Credits may apply to history major or minor. Repeatable to 30 credits.
On demand.

HIST 402. 'A Motley Rabble...'. 3 Credits.
This course explores the rise of a 'Motley Rabble' colonial peoples who John
Adams, in 1770, blamed for the Boston Massacre. It explores the people who
freely and unfreely came to British North America, their interactions with the
peoples they encountered, and the world that they created. It ends by exploring
how this 'Motley Rabble' gained their independence. On demand.

HIST 403. The United States: Age of Jefferson and Jackson, 1789-1850. 3
Credits.
A study of the creation of a new, expansive nationalism in the development of
new institutions and new national character, and the simultaneous growth of
sectional forces which brought the new nation to the brink of Civil War. F.

HIST 404. The United States: Civil War and Reconstruction, 1850-1877. 3
Credits.
A survey of the rise of America to industrial and world power. Emphasis is
placed upon the great changes which the Industrial Revolution brought and the
American response to these changes. Detailed attention is given to the Populist
and Progressive movements. F. odd years.

HIST 405. The United States: Age of Jefferson and Jackson, 1789-1850. 3
Credits.
A study of the creation of a new, expansive nationalism in the development of
new institutions and new national character, and the simultaneous growth of
sectional forces which brought the new nation to the brink of Civil War. F.

HIST 406. The United States: Civil War and Reconstruction, 1850-1877. 3
Credits.
A survey of the acceleration of the forces of sectionalism and racism that caused
the temporary breakdown of the American democratic process and the tragedy
of Civil War and Reconstruction. S. odd years.

HIST 407. The United States: Rise of Industrial America, 1877-1917. 3
Credits.
A survey of the rise of America to industrial and world power. Emphasis is
placed upon the great changes which the Industrial Revolution brought and the
American response to these changes. Detailed attention is given to the Populist
and Progressive movements. F. odd years.

HIST 408. The United States, 1920-1945. 3 Credits.
A study of American society from the end of World War I through World War II.
Emphasis will be placed upon the Republican ascendancy and social changes
during the 1920s, the causes of the Great Depression, the New Deal, the road
to World War II, and the war, especially the homefront. F. odd years.
HIST 412. U.S. Foreign Relations since 1900. 3 Credits.
An advanced survey of the major policies advocated and pursued by the U.S. during the 20th century. F, odd years.

HIST 413. The United States since 1945. 3 Credits.
An advanced examination of the United States as it has developed from the height of its power, influence, and prosperity through years of upheaval, cultural and political transformation, and economic decline. F, even years.

HIST 419. Great Britain since 1815. 3 Credits.
A survey of British history since 1815 with an emphasis on the state of mind known as "Victorian," as it was manifested, practiced, or criticized in the nineteenth century; its influence on economics, politics, foreign affairs, and social policy; and its vestiges in modern-day Britain. F, even years.

HIST 421. The British Empire, 1496-1884. 3 Credits.
A survey of British Imperial history from the Tudors to the "Scramble for Africa." Particular attention will be paid to the social, economic, and political factors which shaped Britain's Imperial history as well as the history of its colonies. F, odd years.

HIST 422. The British Empire and Commonwealth, 1884-the Present. 3 Credits.
A survey of British Imperial history from the "Scramble for Africa" to the present. Beginning with an overview of the early Empire, this course will focus upon the cultural, economic, and political factors which shaped and led to the deconstruction of the Empire/Commonwealth in the modern era. S, even years.

HIST 424. European Witch Trials. 3 Credits.
An examination of the development and content of European witch-beliefs and persecution, from their origins in antiquity and the middle ages through the dawn of the modern era. Emphasis upon witchcraft as a social, legal, and cultural phenomenon. S, odd years.

HIST 425. American Family in Historical Perspective. 3 Credits.
This course is devised as a survey of the family over the nation's first 400 years of existence. Course members will examine variations in the structure of the family, changes in the definition of the family and the forces which have wrought significant alterations in this most basic of social institutions, taking into consideration race, culture, and gender. S.

HIST 431. Seminar in the History of the Great Plains. 3 Credits.
This course promotes focused study of the Great Plains of North America through reading, discussion, research, and writing. Students will examine all aspects of Great Plains history including culture, environment, social organization, economics, and politics from the ancient past to the present. S, odd years.

HIST 440. Research Capstone. 3 Credits.
In this capstone experience, students work closely with a member of the faculty to design and conduct a major research project on a topic of their choice. Students refine their skills in critical thinking, archival research, and persuasive written and oral communication. Prerequisite: HIST 240. F.S.

HIST 450. European Social History. 3 Credits.
This course will cover the methods, historiography, and problems of European social history. The course is divided into three sections for topical content: the Ancien Regime, the Age of Reform, and the Twentieth Century. There are several fairly specific skills students will develop, all of which can loosely be organized under the general heading of "how historians think:" to be able to distinguish between a primary and a secondary source; to be able to analyze a primary source within its appropriate historical context; to be able to locate the thesis or argument in a secondary source and to be able to offer an informed evaluation of that argument; to be able to read a secondary source within its particular context as part of a larger discussion of facts, individuals, events, etc.; and to be able to construct a sound historical thesis/argument of their own, whether in writing or class discussions. F, even years.

HIST 470. United States-Canadian Relations, 1776 to the Present. 3 Credits.
This course explores the historical relationships linking and dividing Canada and the United States of America since 1774. Because of the unique constitutional and diplomatic status of British North America and then Canada itself, this course examines the often complex tri-partite relationship between the U.S., Canada, and Great Britain. F, even years.

HIST 480. Introduction to Public History. 3 Credits.
An introduction to public history at federal, state, and local levels. Emphasis is given to archival theory, oral history, museum studies and historic preservation, with attention to awareness of historical resources. On demand.

HIST 481. Public History Practice. 3 Credits.
A practicum in which the student learns through experience the techniques of public history work. S, odd years.

HIST 489. Senior Honors Thesis. 1-15 Credits.
Supervised independent study culminating in a thesis. Total not to exceed 15 credits. Prerequisites: Consent of the Department and approval of the Honors Committee. F.S.

HIST 494. Readings in History. 1-3 Credits.
Repeatable to 6 credits. Repeatable to 6 credits. F.S.

Bachelor of Arts with Major in History

Required 120 credits (36 of which must be numbered 300 or above, and 30 of which must be from UND) including:

I. Essential Studies (see University ES listing).

II. The following core curriculum:

33 major hours, including:

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<th>Course Code</th>
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<th>Credits</th>
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<tr>
<td>HIST 240</td>
<td>The Historian's Craft</td>
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<tr>
<td>HIST 440</td>
<td>Research Capstone</td>
<td>3</td>
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<tr>
<td>6 Credits from European History Selection (HIST 301, 343, 344, 349, 350, 351, 352, 353, 356, 419, 421, 422, 423, 424, 450)</td>
<td>6 Credits</td>
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<tr>
<td>3 Credits from World History Selection (HIST 230, 269, 327, 328, 335, 345, 362, 381, 426)</td>
<td>3 Credits</td>
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<tr>
<td>6 Credits from any 300+ level History course</td>
<td>6 Credits</td>
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<tr>
<td>6 Credits from any History course</td>
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Total Credits: 33

Minor in History

21 credits required:

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<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tr>
<td>HIST 240</td>
<td>The Historian's Craft</td>
<td>3</td>
</tr>
<tr>
<td>No more than 9 credits of 100 and/or 200 level classes</td>
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<tr>
<td>At least 9 credits of 300 and/or 400 level classes</td>
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Total Credits: 21

Related Field Concentration in Intellectual History, Minor Only

Required: 20 credits Upper Level work approved by the chairs of the History or Philosophy Departments.

Such courses as follows may be used:

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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>HIST 330</td>
<td>The United States: Social and Cultural, 19th Century</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 300</td>
<td>History of Philosophy I (Ancient/Modern)</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 301</td>
<td>History of Philosophy II (Medieval/19th Century)</td>
<td>3</td>
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<tr>
<td>PHIL 302</td>
<td>Renaissance and Enlightenment</td>
<td>3</td>
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<tr>
<td>PHIL 303</td>
<td>Kant and the Nineteenth Century</td>
<td>3</td>
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<tr>
<td>PHIL 312</td>
<td>American Philosophy</td>
<td>3</td>
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<tr>
<td>ART 210</td>
<td>History of Art I</td>
<td>3</td>
</tr>
<tr>
<td>ART 211</td>
<td>History of Art II</td>
<td>3</td>
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Histotechnician Program

Histotechnician Certificate (p. 125)
Courses

HT 360. Histopathology Laboratory Theory. 3 Credits.
This course presents an overview of topics related to histology laboratory operations and an introduction to histology laboratory management. Prerequisite: HT program students only. F,S,SS.

HT 362. Histotechniques I. 3 Credits.
This course is the introduction to the fundamental techniques, including fixation, processing, instrumentation, and solution preparation. Cytoplasmic, nuclear, carbohydrate, and amyloid staining will be presented. Prerequisite: HT program students only. F,S,SS.

HT 363. Histotechniques II. 3 Credits.
This course is the continuation of the fundamental techniques of histology, including muscle and connective tissue, nerves, microorganisms, pigment, minerals, cytoplasmic granules, immunohistochemistry, and enzyme histochemistry. Prerequisite: HT program students only. F,S,SS.

HT 367. Histology Practicum I. 5 Credits.
Communication skills, attitude and work performance will be evaluated. The skills involved will emphasize the fundamental techniques including fixation, specimen processing, instrumentation, sectioning and staining with emphasis on the Hematoxylin and Eosin stain. Prerequisite: HT program students only. Corequisite: HT 362. F,S,SS.

HT 368. Histology Practicum II. 5 Credits.
Individual assignments in an accredited histology lab. Emphasis on refining skills learned in Histology Practicum I, staining procedures and tissue identification. Prerequisite: HT program students only. Corequisite: HT 363. F,S,SS.

HT 399. Special Topics. 1-5 Credits.
Lecture, discussion, and readings on topics of current interest in the pathology laboratory. Prerequisite: HT program students only. Repeatable to 5 credits. F,S,SS.

Histotechnician Certificate

Admission to the certificate program is open to all individuals who meet the following requirements:

1. Associate degree
2. Introduction to Chemistry (Chem 115/L, 4 credits)
3. Concepts of Biology (Biol 111/L, 4 credits)
4. Math at college level
5. Verification of a cumulative GPA of 2.8 on a scale of 4.0
6. Completion of the Biology and Chemistry courses with a C or better
7. Criminal background check
8. Immunization records
9. Verification of acceptance by a clinical site that meets the specification for acceptance in the Histotechnician Certificate Program

Curriculum:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tr>
<td>HT 360</td>
<td>Histopathology Laboratory Theory</td>
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<tr>
<td>HT 362</td>
<td>Histotechniques I</td>
<td>3</td>
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<tr>
<td>HT 363</td>
<td>Histotechniques II</td>
<td>3</td>
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<tr>
<td>HT 367</td>
<td>Histology Practicum I</td>
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<td>HT 368</td>
<td>Histology Practicum II</td>
<td>5</td>
</tr>
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<td>Total</td>
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<td>19</td>
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* Online course
** Clinical Internship at accredited medical center

Honors Program (Hon)

Courses

HON 101. Research Scholars Cornerstone. 3 Credits.
Reading and discussion of selected works that reflect the methodology of the humanities, with emphasis on US Diversity, as a means to establish fundamental skills for responsible research in any field, including: critical and creative thinking, deep reading, scholarly inquiry, and diversity of perspective through an intercultural approach. Taken by first-year students in the Honors Program who identify in the new Research Scholars track. Prerequisite: Admittance to the Honors Program. F,S.

HON 102. Leaders in Action Cornerstone. 3 Credits.
This course will feature readings and discussion of selected works that reflect the methodology of the social sciences, with emphasis on intercultural understanding, as a means to learn about diverse models of leadership and its connection to the Honors experience, and to cultivate skills for becoming thoughtful leaders within a pluralistic, democratic society. First-year students in the Honors Program who identify in the new Leaders in Action track will take this course and critically examine themes like power, effective action, communication, human differences and behavior, public service, and the common good through methods, sources, and paradigms central to the social sciences. Prerequisite: Admittance to the Honors Program. F,S.

HON 260. Honors Experiences. 1-4 Credits.
This flexible course allows Honors students to pursue specially arranged high-impact individual reflective experiences, like service-learning projects, community engagements and volunteering, internships, shadowing opportunities, peer mentoring, or tutoring for Honors credit. May be initiated by students with approval of Honors Director, provided appropriate supervisors are willing and structure for oversight is in place. Generally, credits will be determined by the number of hours devoted to the experience and reflection on it; for example, 1 credit = 15 contact hours, 2 credits = 30 contact hours, etc. Prerequisites: Admittance to Honors Program, and HON 101 or HON 102. Repeatable to 9 credits. F,S,SS.

HON 301. Honors Mode. 1 Credit.
A method of using a 1 credit study load to increase the level of any standard course to an Honors quality course. It provides an intellectual enhancement to a standard course. Prerequisite: Standard course which Honors Mode complements; see department for approval. F,S,SS.

HON 372. Advanced Social Science Colloquium on US Diversity. 3 Credits.
This course is designed to provide an Essential Studies Social Sciences-based, US Diversity overlay course. F,S.

HON 381. Exploring Global Diversity through Humanities. 3-4 Credits.
This course is designed to give students a study abroad experience without having to spend an entire semester abroad. During the semester the students will study the history, art, literature, culture and language of a chosen country. While it is possible that other aspects of the country will be studied the emphasis will be on Humanities subject areas. At the end of spring semester the instructor, students and other chaperones (as needed) will travel to the studied country for 10 to 14 days. The travel will be a requirement. Repeatable. S, odd years.

HON 382. Exploring Global Diversity through Social Science. 3-4 Credits.
This course is designed to give students a study abroad experience without having to spend an entire semester abroad. During the semester the students will study the history, geography, government, politics and culture of a chosen country. While it is possible that other aspects of the country will be studied the emphasis will be on Social Science subject areas. At the end of spring semester the instructor, students and other chaperones (as needed) will travel to the studied country for 10 to 14 days. The travel will be a requirement. Repeatable. S, even years.

HON 391. Advanced Colloquium in the Humanities. 1-4 Credits.
Advanced interdisciplinary courses on varying topics in the humanities. Repeatable. Repeatable. F,S.

HON 392. Advanced Colloquium in the Social Sciences. 1-4 Credits.
Advanced interdisciplinary courses on varying topics in the social sciences. Repeatable. Prerequisite: Admittance to the Honors Program. Repeatable. F,S.

HON 393. Advanced Colloquium in the Sciences. 1-4 Credits.
Advanced interdisciplinary courses on varying topics in the sciences. Repeatable. Prerequisite: Admittance to the Honors Program. Repeatable. F,S.
HON 399. Independent Study. 1-4 Credits.
Individual instruction on specified topics arranged by mutual agreement among teacher, student, and the Program. Repeatable to 12 credits. Repeatable to 12 credits. F, S, SS.

HON 489. Senior Project: Honors Research. 1-8 Credits.
Supervised independent study culminating in a thesis, white paper, literary work, art exhibition, musical or theatrical performance, portfolio, translation, or other focused demonstration of four years’ worth of research or creative work and learning. Prerequisites: Consent of the Department and ENGL 130. Repeatable to 9 credits. F, S, SS.

Honors

Graduation as a Scholar in the Honors Program

Required 125 credits (36 of which must be numbered 300 or above and 60 of which must be from a 4-year institution), including:

I. Twenty-four credits of Honors coursework, eight of which must be taken in colloquia. Honors sections of courses offered by other departments may also count for a portion of the 24 credits. Nine senior Honors thesis credits, to be taken over a minimum of two semesters, also count toward the 24 credits.

II. Sophomore Honors Portfolio, submitted upon completion of nine Honors credits.

III. Senior Honors Thesis.

Note: Honors Program requirements may substitute for the University Essential Studies Requirements.

Humanities (Hum)

Courses

HUM 101. The Human Experience. 4 Credits.
This course uses the individual human experience as a lens for viewing ways of thinking across disciplines, drawing primarily on concepts and methodologies from the humanities but also incorporating ideas from the social sciences and the sciences. Materials chosen each semester will vary, often focusing on a central theme. This course helps students begin to develop competencies in problem solving, personal development, and relating to others. Students may be expected to attend events outside of class. F, S, SS.

HUM 101L. Humanities Recitation.

HUM 102. The Human Community. 4 Credits.
While this course has the same structure and goals as Humanities 101, its subject matter will focus primarily on the methods and expressions of human interactions within communities, with a focus on texts and artifacts that articulate the growth of human consciousness, responsibility, and potential. The texts chosen for this course will require students to compare and contrast ancient and modern ideas in the major disciplines of the humanities. Students may be expected to attend events outside of class. F, S, SS.

HUM 212. Integrated Cultural Experience. 3 Credits.
This course seeks to examine human concerns and motivations through the examination of artistic and cultural expressions. Students will attend and analyze various types of cultural events, including dramatic productions, art shows, films, and music concerts to examine the sub-text of the human condition. They will also study texts in which authors present philosophies regarding the nature of art and the importance of particular mediums (poetry, visual arts, film, etc.) in voicing personal and social concerns. In addition, students will study the philosophy of philanthropy by researching and gaining personal experience in a community service activity. Prerequisite: Consent of instructor. F, S.

HUM 224. Integrated Social Science Inquiry. 2-4 Credits.
Readings and discussion of selected works that reflect the methodology and concerns of the social sciences; integration of social science topics and methods with other Integrated Studies courses/topics. F, S.

HUM 225. Advanced Integrated Social Science. 2-4 Credits.
A continued, in-depth exploration of social science topics raised in Integrated Social Science (224). This course will require that students pursue more advanced research in and consideration of topics included in the social sciences as they relate to the Integrated Studies Program theme. F, S.

HUM 270. Integrated Studies Life Sciences. 3 Credits.
Through a variety of media and experiences, ISP Life Sciences explores historical and modern developments in the Life Sciences that have altered the conception of what it means to be human. ISP Life Sciences is an interdisciplinary examination of the core concepts of Life Sciences that may include genetics, evolution, and ecology through the process of scientific inquiry. No laboratory. F, S.

HUM 271. Integrated Studies General Science. 3 Credits.
Through a variety of media and experiences, General Sciences explores historical and modern developments in the Physical Sciences that have altered the conception of how our world and universe work and the place of humans within it. This course an interdisciplinary examination of the core concepts of Physical Sciences that may include cosmology, environment, climate, and sustainability through the process of scientific inquiry. F, S.

HUM 271L. Integrated Studies General Science Laboratory. 1 Credit.
Three-hour weekly laboratory to complement General Science 271. This hands-on lab experience in scientific discovery utilizes the scientific method. Students develop the skills to design, conduct and analyze their own experiments motivated by their own observations and curiosity. This lab experience emphasizes the link between science and the real world. Labs can range from food science to human behavior. Prerequisite or corequisite: HUM 271. F, S.

HUM 283. Evidenced Based Reasoning Across Disciplines. 3 Credits.
In this course, students will examine chosen issues in the sciences, social sciences, and humanities and will gain a general familiarity with the academic and popular forms of writing, evidence based reasoning, and research in each discipline. They will become familiar with the research methodologies of each discipline and learn to integrate the different methods and perspectives with their own analysis. F, S.

HUM 300. Knowledge, Truth and Reality. 1-3 Credits.
An interdisciplinary exploration of the nature of knowledge, truth, and reality from the perspectives of science, philosophy, and religion. On demand.

HUM 312. Creative Inquiry. 1 Credit.
This hands-on course allows students to deeply pursue and attempt to solve problems that spring from their own curiosity, from a professor’s challenge, or from the pressing needs of the world around them. Course options may vary from a focused analysis of a current problem to team-based investigations led by a faculty mentor or creative endeavor. The purpose of the course activities are to allow students to experience and engage in creative activities or hands on research/problem solving, providing them with deep learning opportunities where they can develop critical thinking skills, team-based problem solving skills, and collaboration, communication, and presentation skills. Offered as needed by permission of department. Repeatable (when topics vary) up to three times. Repeatable to 3 credits. F, S.

HUM 325. Interdisciplinary Global Human Rights. 3 Credits.
This course addresses a variety of current international issues from multiple perspectives and through a lens of interdisciplinarity. Through the study of global issues and topics, students will read, write, and discuss topics of international concern affecting human rights today and the future of the global common. This discussion based course will utilize readings, current events, and other media focusing on critical and creative thinking, and collaborative problem-solving in addressing current world problems. F, S, SS.

HUM 391. Advanced Humanities Seminar. 1-4 Credits.
An interdisciplinary reading, writing and discussion course whose focus varies from semester to semester, but which draws on texts from the Humanities, Social Sciences, and Sciences. Repeatable. F, S, SS.

HUM 408. Writing Across the Disciplines. 3 Credits.
This senior level course will provide students with an intensive writing experience that focuses on methods and strategies in the humanities, social sciences, and sciences. Students will gain an understanding of the theoretical underpinnings of the disciplines while they engage in the process of integrating disciplinary materials and writing tactics as well as formulating written responses to topics of current concern. Prerequisites: ENGL 120 or ENGL 125 or ENGL 130 and Junior/Senior standing. F, S.
Interdisciplinary Health Studies (IDS)

B.S. with a Major in Interdisciplinary Health Studies (http://und-public.courseleaf.com/undergraduateacademicinformation-departmentalcoursesprograms/interdisciplinarystudies/inter-ba-bs)

Courses

IDS 280. Interdisciplinary Thinking and Writing. 3 Credits.
The course will examine the nature of academic disciplines and fields and the way in which knowledge is generated, organized, and shared. Basic assumptions and orientations will be compared and contrasted in the humanities, social sciences, and science disciplines. Current literature in the field of interdisciplinary studies will be presented, with an emphasis on interdisciplinary approaches in the health fields. F.S.

IDS 399. Interdisciplinary Topics. 1-3 Credits.
Topics, problems, or texts that connect or draw upon two or more academic disciplines will be studied. Repeatable when topics vary. Regular or S/U grading. Repeatable to 9 credits. F,S,SS.

IDS 491. Capstone Interdisciplinary Seminar. 1-3 Credits.
This seminar will be organized by the director of the Interdisciplinary Studies Program to act as a point of reference for students working on their Senior Projects in the program. The projects will vary from semester to semester, so the focus will shift accordingly. Not repeatable. Prerequisite: IDS 280. Corequisite: IDS 498. S.

IDS 495. Service and Citizenship. 3 Credits.
Students will design community service projects, or will join existing projects, and engage in volunteer action during the semester. Class meetings on campus will center on a critical discussion of volunteerism and community service; current literature on service learning will be studied. Self-assessment of experiential learning outcomes, as well as a portfolio and essay will be required. Prerequisite: Junior or Senior standing. F,S,SS.

IDS 498. Senior Project. 3 Credits.
The project will be designed on an area of interest which the student has defined. It will include data or material from a variety of disciplines or fields which the student finds relevant to the issue under study. The student will synthesize the cross-cutting information into a creative/original whole and discuss applications of this new approach. Repeatable to 6 credits. Prerequisite: IDS 280. Corequisite: IDS 491. Repeatable to 6 credits. F,S.

International Studies (A&S)

B.A. with Major in International Studies (p. 127)

Minor in International Studies (p. 128)

Courses

A&S 100. Introduction to Peer Mentoring. 1 Credit.
This seminar will serve as an introduction to the Peer Mentor program in the College of Arts Sciences and will include needed training modules for that program. Prerequisite: Successful application to the College of Arts Sciences Peer Mentor program; must obtain permission number from instructor. SS.

A&S 250. Arts & Sciences. 1-4 Credits.
Repeatable to 21 credits.

A&S 251. Study in Canada. 1-12 Credits.
One to twelve credits in any one semester (repeatable with permission of the student's academic department); a course load required to maintain full-time status; at least Sophomore status required; GPA of at least 2.5; must become familiar with Canadian study procedures, application, credit transfer and other matters as outlined in the Study Abroad Handbook; courses to be taken during a study in Canada must have pre-approval from student's academic department. Prerequisites: Sophomore status or higher and a GPA of 2.5 or higher. Repeatable. F,S,SS.

A&S 252. Introduction to Canadian Studies. 3 Credits.
An interdisciplinary, team-taught course focusing on the historical, geographical, socio-cultural, literary, political, economic, and international qualities that make Canada and its communities both vibrant and unique. F.

A&S 260. Exploring Topical Challenges. 3 Credits.
Students will conduct signature work in interdisciplinary teams based on semester-long themes. The first half of the course will focus on exploration and inquiry on a chosen theme (varies by semester). The second half of the course will focus on student-driven group projects designed to enhance students' ability to work in diverse teams and engage in unstructured problem solving. Prerequisites: ENGL 130; 20 completed credit hours. F.S.

A&S 294. Directed Studies. 1-4 Credits.
Specially arranged individual tutorials, projects, or reading programs on a variety of subjects not covered by regular departmental offerings. May be initiated by students with approval of dean and departments involved, provided appropriate faculty members are willing. Repeatable as topics vary to 8 credits. Repeatable to 8 credits.

A&S 299. Special Topics. 1-4 Credits.
Specially arranged seminars or courses on a variety of subjects not covered by regular departmental offerings. May be initiated by students with approval of dean and departments involved, provided appropriate faculty members are willing. Repeatable. On demand.

A&S 351. Introduction to Law and Legal Studies. 3 Credits.
Segments on Contracts, Criminal Law, Constitutional Law, and Torts, taught in customary law school manner to acquaint undergraduates and others interested in exploring a career in the legal profession with law school methodology and legal analysis.

A&S 497. Internship. 1-4 Credits.
This internship is a short-term work experience emphasizing hands-on learning that is not covered by regular departmental offerings. Prerequisite: Permission of instructor. Repeatable to 12 credits. F,S,SS.

A&S 499. Special Topics. 1-4 Credits.
Specially arranged seminars or courses on a variety of subjects not covered by regular departmental offerings. May be initiated by students with approval of dean and departments involved, provided appropriate faculty members are willing. Repeatable as topics vary. Repeatable.

Bachelor of Arts with Major in International Studies

Required 120 credits (36 of which must be numbered 300 or above, and 30 of which must be from UND) including:

I. Essential Studies requirements (See University ES listing)

II. A major in International Studies consists of 30 credits plus language credits. Students are required to participate in a study abroad experience through a University sponsored program. The program is organized around several categories: Language; Introduction and Capstone; Discipline Diversity; Regional & Thematic Diversity; Regional Diversity Outside of Concentration; and Study Abroad.

Language The foreign language requirement has two options: Option 1 Level IV second language proficiency plus two courses at the 300/400 levels in the same language. 300/400 level courses in languages can be counted towards the Regional & Thematic concentration (6 courses, 22 credits); Option 2 Level IV proficiency in second language plus level II proficiency in third language (6 courses, 24 credits)

Global Perspectives & Capstone: required unless authorized substitution

POLS 120 Global Perspectives 3
LANG 380 Global Gateways 3
LANG 480 Capstone: Global Connections 3

Discipline Diversity: 6 credits from the courses below in different departments.

ANTH 171 Introduction to Cultural Anthropology 3
ENGL 228 Diversity in Global Literatures 3
ENGL 242 World Literature II 3
GEOG 161 World Regional Geography 3
GEOG 250 Introduction to Geopolitics 3
HIST 105 World Civilizations I 3
HIST 106 World Civilizations II 3

University of North Dakota 127
KIN 108. Fitness and Conditioning I. 1 Credit.
These courses are designed for beginners. They include instruction in various fitness and conditioning activities (e.g., aerobic exercise, pilates, yoga, etc.). For specific course content, see the current schedule of classes. Repeatable to 4 credits. On demand.

KIN 110. First Aid and CPR. 1 Credit.
Recommended First Aid and CPR practices for the care of persons who have been injured or suddenly become ill. Qualifying students will have the option to become certified in CPR, AED and First Aid. F,S.

KIN 111. Individual Sports/Activities I. 1 Credit.
These courses are designed for beginners. They include instruction in various individual sports and activities (e.g., golf, ice skating, track and field events, etc.). For specific course content, see the current schedule of classes. Repeatable to 4 credits. On demand.

KIN 112. Outdoor Pursuits I. 1 Credit.
These courses are designed for beginners. They include instruction in various outdoor pursuit activities (e.g., camping, cycling, cross-country skiing, etc.). For specific course content, see the current schedule of classes. Repeatable to 4 credits. On demand.

KIN 113. Racquet Sports I. 1 Credit.
These courses are designed for beginners. They include instruction in various racquet sports (e.g., badminton, racquetball, tennis, etc.). For specific course content, see the current schedule of classes. Repeatable to 4 credits. On demand.

KIN 114. Strength Training I. 1 Credit.
These courses are designed for beginners. They include instruction in various types of strength training (e.g., body building, power lifting, weight training, etc.). For specific course content, see the current schedule of classes. Repeatable to 4 credits. On demand.

KIN 115. Target Sports I. 1 Credit.
These courses are designed for beginners. They include instruction in various target sports (e.g., trapshooting, skeet, etc.). For specific course content, see the current schedule of classes. Repeatable to 4 credits. On demand.

KIN 116. Team Sports I. 1 Credit.
These courses are designed for beginners. They include instruction in various team sports (e.g., baseball, basketball, football, ice hockey, soccer, volleyball, etc.). For specific course content, see the current schedule of classes. Repeatable to 4 credits. On demand.

KIN 117. Gymnastics I. 1 Credit.
These courses are designed for beginners. They include instruction in various types of gymnastics (e.g., artistic, trampolining, tumbling, etc.). For specific course content, see the current schedule of classes. Repeatable to 4 credits. On demand.

KIN 118. Military Conditioning I. 1 Credit.
This course is designed for beginners. It includes instruction in military conditioning. Repeatable to 4 credits. On demand.

KIN 118A. Air Force Conditioning I. 1 Credit.
This course is designed for beginners, emphasizing on the Air Force components of physical fitness; cardiorespiratory endurance, muscular strength, muscular endurance, flexibility and body composition. A key objective is for each student achieve a minimum score of 180 points total, in four events of the Air Force Personal Fitness Assessment (AFPFA): push-ups, sit-ups, a 1.5 mile run and waist measurement. Repeatable to 4 credits. F.

KIN 124. Aquatics II. 1 Credit.
Prerequisite: KIN 104 in the same activity or consent of the instructor. These courses provide intermediate level instruction in various aquatics-related activities (e.g., swimming, diving, etc.). For specific course content, see the current schedule of classes. Repeatable to 4 credits. On demand.

KIN 125. Combative Sports II. 1 Credit.
Prerequisite: KIN 105 in the same activity or consent of the instructor. These courses provide intermediate level instruction in various combative sports (e.g., boxing, kickboxing, etc.). For specific course content, see the current schedule of classes. Repeatable to 4 credits. On demand.

KIN 127. Dance II. 1 Credit.
Prerequisite: KIN 107 in the same activity or consent of the instructor. These courses provide intermediate level instruction in various dance types (e.g., ballroom, hip-hop, etc.). For specific course content, see the current schedule of classes. Repeatable to 4 credits. On demand.
**KIN 128. Fitness and Conditioning II. 1 Credit.**
Prerequisite: KIN 108 in the same activity or consent of the instructor. These courses provide intermediate level instruction in fitness and conditioning activities (e.g., aerobic exercise, pilates, yoga, etc.). For specific course content, see the current schedule of classes. Repeatable to 4 credits. On demand.

**KIN 131. Individual Sports/Activities II. 1 Credit.**
Prerequisite: KIN 111 in the same activity or consent of the instructor. These courses provide intermediate level instruction in various individual sports and activities (e.g., golf, ice skating, track and field events, etc.). For specific course content, see the current schedule of classes. Repeatable to 4 credits. On demand.

**KIN 132. Outdoor Pursuits II. 1 Credit.**
Prerequisite: KIN 112 in the same activity or consent of the instructor. These courses provide intermediate level instruction in various outdoor pursuit activities (e.g., camping, cycling, cross-country skiing, etc.). For specific course content, see the current schedule of classes. Repeatable to 4 credits. On demand.

**KIN 133. Racquet Sports II. 1 Credit.**
Prerequisite: KIN 113 in the same activity or consent of the instructor. These courses provide intermediate level instruction in various racquet sports (e.g., badminton, racquetball, tennis, etc.). For specific course content, see the current schedule of classes. Repeatable to 4 credits. On demand.

**KIN 134. Strength Training II. 1 Credit.**
Prerequisite: KIN 114 in the same activity or consent of the instructor. These courses provide intermediate level instruction in various types of strength training (e.g., body building, power lifting, weight training, etc.). For specific course content, see the current schedule of classes. Repeatable to 4 credits. On demand.

**KIN 135. Target Sports II. 1 Credit.**
Prerequisite: KIN 115 in the same activity or consent of the instructor. These courses provide intermediate level instruction in various target sports (e.g., trapshooting, skeet, etc.). For specific course content, see the current schedule of classes. Repeatable to 4 credits. On demand.

**KIN 136. Team Sports II. 1 Credit.**
Prerequisite: KIN 116 in the same activity or consent of the instructor. These courses provide intermediate level instruction in various team sports (e.g., baseball, basketball, football, ice hockey, soccer, volleyball, etc.). For specific course content, see the current schedule of classes. Repeatable to 4 credits. On demand.

**KIN 137. Gymnastics II. 1 Credit.**
Prerequisite: KIN 117 in the same activity or consent of the instructor. These courses provide intermediate level instruction in various types of gymnastics (e.g., artistic, trampolining, tumbling, etc.). For specific course content, see the current schedule of classes. Repeatable to 4 credits. On demand.

**KIN 138. Military Conditioning II. 1 Credit.**
This course provides intermediate level instruction in military conditioning. Prerequisite: The course is for AFROTC enrolled students only. F.S.

**KIN 138A. Air Force Conditioning II. 1 Credit.**
This course is designed for intermediate level instruction, emphasizing on the Air Force components of physical fitness; cardiorespiratory endurance, muscular strength, muscular endurance, flexibility and body composition. A key objective is for each student achieve a minimum score of 180 points total, in four events of the Air Force Personal Fitness Assessment (AFPFA); push-ups, sit-ups, a 1.5 mile run and waist measurement. Repeatable to 4 credits. S.

**KIN 144. Aquatics III. 1 Credit.**
Prerequisite: KIN 124 in the same activity or consent of the instructor. These courses provide advanced level instruction in various aquatics-related activities (e.g., swimming, diving, etc.). For specific course content, see the current schedule of classes. Repeatable to 4 credits. On demand.

**KIN 145. Combative Sports III. 1 Credit.**
Prerequisite: KIN 125 in the same activity or consent of the instructor. These courses provide advanced level instruction in various combative sports (e.g., boxing, kickboxing, etc.). For specific course content, see the current schedule of classes. Repeatable to 4 credits. On demand.

**KIN 147. Dance III. 1 Credit.**
Prerequisite: KIN 127 in the same activity or consent of the instructor. These courses provide advanced level instruction in various dance types (e.g., ballroom, hip-hop, etc.). For specific course content, see the current schedule of classes. Repeatable to 4 credits. On demand.

**KIN 148. Fitness and Conditioning III. 1 Credit.**
Prerequisite: KIN 128 in the same activity or consent of the instructor. These courses provide advanced level instruction in various fitness and conditioning activities (e.g., aerobic exercise, pilates, yoga, etc.). For specific course content, see the current schedule of classes. Repeatable to 4 credits. On demand.

**KIN 151. Individual Sports/Activities III. 1 Credit.**
Prerequisite: KIN 131 in the same activity or consent of the instructor. These courses provide advanced level instruction in various individual sports and activities (e.g., golf, ice skating, track and field events, etc.). For specific course content, see the current schedule of classes. Repeatable to 4 credits. On demand.

**KIN 152. Outdoor Pursuits III. 1 Credit.**
Prerequisite: KIN 132 in the same activity or consent of the instructor. These courses provide advanced level instruction in various outdoor pursuit activities (e.g., camping, cycling, cross-country skiing, etc.). For specific course content, see the current schedule of classes. Repeatable to 4 credits. On demand.

**KIN 153. Racquet Sports III. 1 Credit.**
Prerequisite: KIN 133 in the same activity or consent of the instructor. These courses provide advanced level instruction in various racquet sports (e.g., badminton, racquetball, tennis, etc.). For specific course content, see the current schedule of classes. Repeatable to 4 credits. On demand.

**KIN 154. Strength Training III. 1 Credit.**
Prerequisite: KIN 134 in the same activity or consent of the instructor. These courses provide advanced level instruction in various types of strength training (e.g., body building, power lifting, weight training, etc.). For specific course content, see the current schedule of classes. Repeatable to 4 credits. On demand.

**KIN 155. Target Sports III. 1 Credit.**
Prerequisite: KIN 135 in the same activity or consent of the instructor. These courses provide advanced level instruction in various target sports (e.g., trapshooting, skeet, etc.). For specific course content, see the current schedule of classes. Repeatable to 4 credits. On demand.

**KIN 156. Team Sports III. 1 Credit.**
Prerequisite: KIN 136 in the same activity or consent of the instructor. These courses provide intermediate level instruction in various team sports (e.g., baseball, basketball, football, ice hockey, soccer, volleyball, etc.). For specific course content, see the current schedule of classes. Repeatable to 4 credits. On demand.

**KIN 157. Gymnastics III. 1 Credit.**
Prerequisite: KIN 137 in the same activity or consent of the instructor. These courses provide advanced level instruction in various types of gymnastics (e.g., artistic, trampolining, tumbling, etc.). For specific course content, see the current schedule of classes. Repeatable to 4 credits. On demand.

**KIN 158. Military Conditioning III. 1 Credit.**
This course provides advanced level instruction in military conditioning. Prerequisite: KIN 138 or consent of instructor. Repeatable to 4 credits. On demand.

**KIN 158A. Air Force Conditioning III. 1 Credit.**
This course is designed for advanced level instruction, emphasizing on the Air Force components of physical fitness; cardiorespiratory endurance, muscular strength, muscular endurance, flexibility and body composition. A key objective is for each student achieve a minimum score of 180 points total, in four events of the Air Force Personal Fitness Assessment (AFPFA); push-ups, sit-ups, a 1.5 mile run and waist measurement. Repeatable to 4 credits. S.

**KIN 207. Prevention, Care and Legal Issues for Injury. 3 Credits.**
A study of the prevention, care and legal aspects of injuries incurred by individuals in physical activity settings across the lifespan. Includes recommended first aid and CPR practices for the care of persons who have been injured. Prerequisite: KIN Majors, Health Education Minors Athletic Coaching Minors only. F.S.

**KIN 207L. Prevention And Care Of Injuries Lab. 1 Credit.**
Corequisite: KIN 207.
KIN 224, Aquatics: Movement Performance and Analysis (MP&A). 1 Credit.
Course may be repeated as long as content varies, to a maximum of 12 credits for the KIN 220-239 series. These courses focus on the development of performance, performance analysis and knowledge in various aquatic-related activities (e.g., swimming, diving, etc.). These are professional preparation courses for KIN majors. For specific course content, see the current schedule of classes. Prerequisite or Corequisite: KIN 104, KIN 124, or KIN 144; or performance equivalent in same area. Repeatable to 12 credits. On demand.

Course may be repeated as long as content varies, to a maximum of 12 credits for the KIN 220-239 series. These courses focus on the development of performance, performance analysis and knowledge in various combative sports (e.g., kickboxing, etc.). These are professional preparation courses for KIN majors. For specific course content, see the current schedule of classes. Prerequisite or Corequisite: KIN 105, KIN 125, or KIN 145; or performance equivalent in same area. Repeatable to 12 credits. On demand.

KIN 227. Dance: Movement Performance and Analysis (MP&A). 1 Credit.
Course may be repeated as long as content varies, to a maximum of 12 credits for the KIN 220-239 series. These courses focus on the development of performance, performance analysis and knowledge in various dance types (e.g., ballet, hip-hop, etc.). These are professional preparation courses for KIN majors. For specific course content, see the current schedule of classes. Prerequisite or Corequisite: KIN 107, KIN 127, or KIN 147; or performance equivalent in same area. Repeatable to 12 credits. On demand.

KIN 228, Fitness & Conditioning: Movement Performance and Analysis (MP&A). 1 Credit.
Course may be repeated as long as content varies, to a maximum of 12 credits for the KIN 220-239 series. These courses focus on the development of performance, performance analysis and knowledge in various fitness and conditioning activities (e.g., aerobic exercise, pilates, yoga, etc.). These are professional preparation courses for KIN majors. For specific course content, see the current schedule of classes. Prerequisite or Corequisite: KIN 108, KIN 128, or KIN 148; or performance equivalent in same area. Repeatable to 12 credits. On demand.

KIN 231, Individual Sports/Activities: Movement Performance and Analysis (MP&A). 1 Credit.
Course may be repeated as long as content varies, to a maximum of 12 credits for the KIN 220-239 series. These courses focus on the development of performance, performance analysis and knowledge in various individual sports and activities (e.g., golf, ice skating, track and field events, etc.). These are professional preparation courses for KIN majors. For specific course content, see the current schedule of classes. Prerequisite or Corequisite: KIN 111, KIN 131, or KIN 151; or performance equivalent in same area. Repeatable to 12 credits. On demand.

Course may be repeated as long as content varies, to a maximum of 12 credits for the KIN 220-239 series. These courses focus on the development of performance, performance analysis and knowledge in various outdoor pursuit activities (e.g., camping, cycling, cross-country skiing, etc.). These are professional preparation courses for KIN majors. For specific course content, see the current schedule of classes. Prerequisite or Corequisite: KIN 112, KIN 132, or KIN 152; or performance equivalent in same area. Repeatable to 12 credits. On demand.

Course may be repeated as long as content varies, to a maximum of 12 credits for the KIN 220-239 series. These courses focus on the development of performance, performance analysis and knowledge in various racquet sports (e.g., badminton, racquetball, tennis, etc.). These are professional preparation courses for KIN majors. For specific course content, see the current schedule of classes. Prerequisite or Corequisite: KIN 113, KIN 133, or KIN 153; or performance equivalent in same area. Repeatable to 12 credits. On demand.

KIN 234, Strength Training: Movement Performance and Analysis (MP&A). 1 Credit.
Course may be repeated as long as content varies, to a maximum of 12 credits for the KIN 220-239 series. These courses focus on the development of performance, performance analysis and knowledge in various types of strength training (e.g., body building, power lifting, weight training, etc.). These are professional preparation courses for KIN majors. For specific course content, see the current schedule of classes. Prerequisite or Corequisite: KIN 114, KIN 134, or KIN 154; or performance equivalent in same area. Repeatable to 12 credits. On demand.

KIN 235. Target Sports: Movement Performance and Analysis (MP&A). 1 Credit.
Course may be repeated as long as content varies, to a maximum of 12 credits for the KIN 220-239 series. These courses focus on the development of performance, performance analysis and knowledge in various target sports (e.g., trapshooting, skeet, etc.). These are professional preparation courses for KIN majors. For specific course content, see the current schedule of classes. Prerequisite or Corequisite: KIN 115, KIN 135, or KIN 155; or performance equivalent in same area. Repeatable to 12 credits. On demand.

KIN 236. Team Sports: Movement Performance and Analysis (MP&A). 1 Credit.
Course may be repeated as long as content varies, to a maximum of 12 credits for the KIN 220-239 series. These courses focus on the development of performance, performance analysis and knowledge in various team sports (e.g., baseball, basketball, football, ice hockey, soccer, volleyball, etc.). These are professional preparation courses for KIN majors. For specific course content, see the current schedule of classes. Prerequisite or Corequisite: KIN 116, KIN 136, or KIN 156; or performance equivalent in same area. Repeatable to 12 credits. F.S.

KIN 237. Gymnastics: Movement Performance and Analysis (MP&A). 1 Credit.
Course may be repeated as long as content varies, to a maximum of 12 credits for the KIN 220-239 series. These courses focus on the development of performance, performance analysis and knowledge in various types of gymnastics (e.g., artistic, trampolining, tumbling, etc.). These are professional preparation courses for KIN majors. For specific course content, see the current schedule of classes. Prerequisite or Corequisite: KIN 117, KIN 137, or KIN 157; or performance equivalent in same area. Repeatable to 12 credits. On demand.

KIN 240. Introduction to Wellness. 2 Credits.
Designed to encourage personal awareness and responsibility for the maintenance of health and well-being. This course will study the multi-dimensional nature of wellness and the pivotal role that each dimension plays in personal self-fulfillment. F.S.

KIN 241. Introduction to Coaching. 2 Credits.
An introduction and overview of relevant philosophy, sport psychology, sport pedagogy, sport physiology, sport medicine and sport management issues confronting coaches. Coaching is presented with emphasis on effective instructional techniques and coaching principles based upon scientific knowledge. F.

KIN 242. Introduction to Kinesiology. 2 Credits.
An introduction and overview of area as in Kinesiology. Includes information on the required preparation and training for careers in this area. On demand.

KIN 276. Motor Learning. 2 Credits.
Consideration of various factors which may affect learning and performance in human movement activities. Prerequisite: KIN majors only or consent of instructor. Corequisite: KIN 276L. S.

KIN 276L. Motor Learning Lab. 1 Credit.
Demonstration of various factors which may affect learning and performance in human movement activities. Prerequisite: KIN major only or consent of the instructor. Corequisite: KIN 276. S.

KIN 290. Physical Education Activities for the Elementary Grades. 3 Credits.
Study of physical activities in modern physical education programs for grades K-6. Emphasis on skill themes and developmentally appropriate activities. F.

KIN 299. Special Topics in Kinesiology. 1-4 Credits.
Specialized topics related to Kinesiology. Repeatable to 9 credits. Repeatable to 9 credits. On demand.
KIN 305. Health/Physical Education for Early Childhood and Elementary Education Teachers. 3 Credits.
This course provides background information and skills for the early childhood and elementary teacher to implement coordinated health education in the elementary grades and how to provide support and effective instruction in elementary physical education. Prerequisite: Admission to the Teacher Education program. F,S,SS.

KIN 309. Water Safety Instruction. 2 Credits.
Scientific movement principles and techniques as they apply to the teaching and conduct of swimming and water safety. Prerequisite: KIN 104C or demonstrated ability to swim 15 yards of front, back crawl and breaststroke. S,SS.

KIN 325. Youth and Children in Sport. 3 Credits.
Analysis of research findings in physical education, exercise science and wellness with applications to coaching children and youth in sport. F.

KIN 326. Fundamentals of Physical Conditioning. 3 Credits.
A study of the basic knowledge, principles, and methods of physical conditioning for improved health, wellness, physical fitness and athletic performance. Prerequisite: KIN Majors or coaching minors only or consent of instructor. F,S.

KIN 327. Fitness for Life. 3 Credits.
A classroom course focusing on advanced concepts of lifetime fitness and wellness from a consumer perspective. Emphasis is on the development of personal programs for fitness and wellness. F,S.

KIN 332. Biomechanics. 2 Credits.
The study of human movement with special emphasis on those movements related to sport and physical activity. Prerequisites: KIN or Athletic Training majors only, or consent of instructor; ANAT 204, ANAT 204L. Corequisite: KIN 332L. F,SS.

KIN 332L. Biomechanics Laboratory. 1 Credit.
The demonstration of biomechanical principles related to movement in sport and physical activity. Prerequisites: KIN or Athletic Training Majors only, or consent of instructor; ANAT 204 and 204L. Corequisite: KIN 332. F.

KIN 341. Organization and Administration of Athletics. 2 Credits.
Principles and practices for management of the interscholastic athletic program. Prerequisite: Athletic Coaching minors only. S.

KIN 355. Applied Motor Development. 3 Credits.
Changes in motor performance which occur with age; physical and mental development as they relate to these changes. Prerequisite: KIN Majors only or consent of instructor. S.

KIN 375. Exercise and Weight Training Skills and Teaching Techniques. 3 Credits.
Knowledge and practical skills needed to lead group exercise and weight training classes (including adaptations needed for special populations). Prerequisite: KIN 326. S.

KIN 376. Essentials of Personal Training. 3 Credits.
Knowledge and skills required to provide personal training for individuals and/or small groups including aerobic and anaerobic exercise prescription. Prerequisite: KIN 326. F.

KIN 390. Introduction to Teaching in Physical Education and Coaching. 2 Credits.
Strategy for classroom management, planning, instruction, and assessment of teacher and student behavior. Special emphasis on systematic development of a variety of teaching skills through practice and feedback in individual and small group situations. Prerequisites: KIN 220-239 series requirements. Corequisite: KIN 390L. On demand.

KIN 390L. Introduction to Teaching in Physical Education and Coaching Laboratory. 2 Credits.

KIN 397. Cooperative Education. 1-4 Credits.
Part of the educational system where KIN majors can earn academic credit for career work done in their field of study. Arranged by mutual agreement among student, department, and employer. Repeatable to 16 credits. Prerequisite: KIN majors only. Repeatable to 16 credits. S/U grading. F,S,SS.

KIN 400. Methods and Materials for Teaching Physical Education Elementary School. 2 Credits.
The development of skills and knowledge related to teaching physical education to young children in elementary school. Prerequisites: KIN 305 and admission to Teacher Education. Corequisite: KIN 400L. S.

KIN 400L. Methods and Materials for Teaching Physical Education in the Elementary School -Laboratory. 2 Credits.
Supervised teaching experiences in the elementary schools for developing teaching skills for pre-service teachers. Prerequisites: KIN 305 and admission to Teacher Education. Corequisite: KIN 400. S.

KIN 401. Sport Sociology. 3 Credits.
The critical exploration of the function of sports in American culture, in an interdisciplinary fashion, with a focus on the contemporary scene. F,S,SS.

KIN 402. Exercise Physiology. 3 Credits.
The acute and chronic effect of the type, intensity and duration of exercise on physiological functions. Prerequisites: KIN or Athletic Training majors only, or consent of instructor; PPT 301 or Human Physiology equivalent. Corequisite: KIN 402L. F.

KIN 402L. Exercise Physiology Laboratory. 1 Credit.
The demonstration and measurement of the acute effects of exercise on physiological functions. Prerequisites: KIN or Athletic Training majors only, or consent of instructor; PPT 301 or Human Physiology equivalent. Corequisite: KIN 402. F.

KIN 403. School Health Education. 2 Credits.
Provides prospective health educators with a cursory look at health curriculum construction and investigation of different methods, devices and classroom techniques. Prerequisite: KIN majors only. S.

KIN 404. Adapted Physical Activity. 3 Credits.
A study of the physical and motor characteristics and needs of persons with disabilities across the lifespan. Application focuses on planning and implementing physical education and activity programs in school and/or community settings. Prerequisites: Junior or Senior Standing and KIN majors only or consent of instructor. S.

KIN 410. Methods and Materials for Teaching Physical and Health Education in the Secondary School. 3 Credits.
Instructional skills and curriculum analysis for secondary school physical and health education. Prerequisites: KIN 400 and admission to Teacher Education. Corequisite: KIN 410L. F.

KIN 410L. Methods and Materials for Teaching Physical & Health Education in the Secondary School-Laboratory. 1 Credit.
Supervised experiences in the secondary school for the purpose of developing teaching skills for physical and health education. Prerequisite: KIN 400L and admission to Teacher Education. Corequisite: KIN 410. F.

KIN 420. Curriculum Development for Physical and Health Education. 3 Credits.
An examination of different curriculum models used in K-12 physical education programs as well as health education programs. Also, study of national and state standards, program development and assessment, and future trends in school physical education. Prerequisites: KIN 390/390L, admission to Teacher Education. S.

KIN 424. Aquatics: Coaching Methods. 2 Credits.
Repeatable with different sports to a maximum of 10 credits in the KIN 420-439 series. Prerequisite: matching KIN 224 in the same area. These courses focus on methods employed in coaching specific aquatics-related activities (e.g., swimming, diving, etc.). For specific course content, see the current schedule of classes. F,S,SS.

KIN 425. Combative Sports: Coaching Methods. 2 Credits.
Repeatable with different sports to a maximum of 10 credits in the KIN 420-439 series. Prerequisite: matching KIN 225 in the same area. These courses focus on methods employed in coaching specific combative sports (e.g., boxing, kickboxing, etc.). For specific course content, see the current schedule of classes. F,S,SS.

KIN 427. Dance: Coaching Methods. 2 Credits.
Repeatable with different sports to a maximum of 10 credits in the KIN 420-439 series. Prerequisite: matching KIN 227 in the same area. These courses focus on methods employed in coaching specific dance types (e.g., ballroom, hip-hop, etc.). For specific course content, see the current schedule of classes. F,S,SS.
KIN 428. Fitness and Conditioning: Coaching Methods. 2 Credits. 
Repeatable with different sports to a maximum of 10 credits in the KIN 420-439 series. Prerequisite: matching KIN 228 in the same area. These courses focus on methods employed in coaching specific fitness and conditioning activities (e.g., aerobic exercise, pilates, yoga, etc.). For specific course content, see the current schedule of classes. F,S,SS.

KIN 431. Individual Sports/Activities: Coaching Methods. 2 Credits. 
Repeatable with different sports to a maximum of 10 credits in the KIN 420-439 series. Prerequisite: matching KIN 231 in the same area. These courses focus on methods employed in coaching individual sports and activities (e.g., golf, ice skating, track and field events, etc.). For specific course content, see the current schedule of classes. F,S,SS.

KIN 432. Individual Sports/Activities: Coaching Methods. 2 Credits. 
Repeatable with different sports to a maximum of 10 credits in the KIN 420-439 series. Prerequisite: matching KIN 232 in the same area. These courses focus on methods employed in coaching specific outdoor pursuit activities (e.g., camping, cycling, cross-country skiing, etc.). For specific course content, see the current schedule of classes. F,S,SS.

KIN 433. Racquet Sports: Coaching Methods. 2 Credits. 
Repeatable with different sports to a maximum of 10 credits in the KIN 420-439 series. Prerequisite: matching KIN 233 in the same area. These courses focus on methods employed in coaching specific racquet sports (e.g., badminton, racquetball, tennis, etc.). For specific course content, see the current schedule of classes. F,S,SS.

KIN 434. Strength Training: Coaching Methods. 2 Credits. 
Repeatable with different sports to a maximum of 10 credits in the KIN 420-439 series. Prerequisite: matching KIN 234 in the same area. These courses focus on methods employed in coaching specific types of strength training (e.g., body building, power lifting, weight training, etc.). For specific course content, see the current schedule of classes. F,S,SS.

KIN 435. Target Sports: Coaching Methods. 2 Credits. 
Repeatable with different sports to a maximum of 10 credits in the KIN 420-439 series. Prerequisite: matching KIN 235 in the same area. These courses focus on methods employed in coaching specific target sports (e.g., trapshooting, skeet, etc.). For specific course content, see the current schedule of classes. F,S,SS.

KIN 436. Team Sports: Coaching Methods. 2 Credits. 
Repeatable with different sports to a maximum of 10 credits in the KIN 420-439 series. Prerequisite: matching KIN 236 in the same area. These courses focus on methods employed in coaching specific team sports (e.g., baseball, basketball, football, ice hockey, soccer, volleyball, etc.). For specific course content, see the current schedule of classes. F,S,SS.

KIN 437. Gymnastics: Coaching Methods. 2 Credits. 
Repeatable with different sports to a maximum of 10 credits in the KIN 420-439 series. Prerequisite: matching KIN 237 in the same area. These courses focus on methods employed in coaching specific types of gymnastics (e.g., artistic, trampoline, tumbling, etc.). For specific course content, see the current schedule of classes. F,S,SS.

KIN 440. Sport Psychology. 3 Credits. 
Examination of psychological constructs influencing sport and exercise. F,S,SS.

KIN 446. Exercise Testing and Prescription. 3 Credits. 
Development of skills in testing, prescribing and delivering exercise for the broader community across the lifespan. Prerequisites: KIN 326, KIN 402 and KIN 402L. S.

KIN 491. Senior Capstone. 3 Credits. 
Focus on reflection, professional growth including information literacy and communication, collaboration, learning communities, professional decision making, and technology applications in Kinesiology and Public Health. Prerequisite: Senior standing. F,S.

KIN 494. Directed Studies/Research in KIN. 1-4 Credits. 
An in-depth study or participation in a research project in a subject area selected by the student under faculty supervision. Repeatable to 9 credits. Prerequisite: Consent of instructor. Repeatable to 9 credits. F,S,SS.

KIN 495. Service Learning in KIN. 2 Credits. 
Independent and group study of professional placement and leadership in kinesiology settings. Practical experiences in these settings within the community. Includes lectures, site visits, and fieldwork hours. Prerequisite: Instructor consent. F,S,SS.

KIN 496. Field Study in KIN. 1-8 Credits. 
Placement of student in a practical setting under university faculty supervision. Repeatable to 8 credits. Prerequisites: Consent of instructor and upper division status. Repeatable to 8 credits. F,S,SS.

KIN 497. Internship in KIN. 1-10 Credits. 
Development of professional skills through practical experience in agencies such as hospitals, physical therapy clinics, retirement or convalescent centers, work site wellness programs, fitness facilitation, on-campus fitness programs and community sports organizations under the supervision of professionals and faculty. Credits are taken during one semester for paid or volunteer work. Prerequisites: KIN majors only, consent of instructor, upper division status, and current First Aid/CPR certification. Repeatable to 10 credits. S/U grading. F,S,SS.

KIN 498. Practicum. 3 Credits. 
Supervised experiences for development of coaching skills and/or exercise instruction. Repeatable to 6 credits. F,S,SS.

KIN 499. Special Topics in KIN. 1-4 Credits. 
Investigation of special topics in the study of physical education, exercise science and wellness not included in current departmental course offerings. Repeatable to 4 credits. Prerequisites: KIN majors only and consent of instructor. Repeatable to 4 credits. F,S,SS.

PHE Courses

PHE 101. Introduction to Public Health. 3 Credits. 
Introduction to the population health approach to public health. Principles of evidence-based public health and tools for implementation including health communications and informatics, applications of social and behavioral sciences, and health policy, law and ethics. Methods for addressing non-communicable diseases, communicable disease and environmental diseases and injury. An overview of the U.S. health care system and comparisons with health care systems in other developed countries. Examination of public health institutions and systems at the local/state, federal and global levels as well as future issues in public health. F.

PHE 102. Epidemiology in Public Health. 3 Credits. 
This course covers applications of epidemiologic methods and procedures to the study of the distribution and factors influencing health and diseases, morbidity, injuries, disability, and mortality in populations. Epidemiologic methods for the control of conditions such as infectious and chronic diseases, mental disorders, community and environmental health hazards, and unintentional injuries are discussed. Other topics include quantitative aspects of epidemiology, for example, data sources, measures of morbidity and mortality, evaluation of association and causality, and study design. F,S.

PHE 103. Introduction to Global Health. 3 Credits. 
The purpose of this course is to provide the students with the basic knowledge of health indicators, major determinants, and trends of global health. F.

PHE 301. Principles and Foundation of Health Education. 3 Credits. 
The purpose of this course is to provide the students the historical perspectives of health and health education; professional issues and ethics; credentialing; principles, practices, theoretical frameworks, and foundations of health education. Prerequisite: PHE 101. F.

PHE 302. Community Health. 3 Credits. 
Concepts of community and public health, health advocacy, and cultural competence; role of government, nonprofit and private agencies; investigation of health issues. Prerequisite: PHE 101. F.

PHE 303. Organization and Administration of Community Health Programs. 3 Credits. 
The purpose of this course is to provide the students with the basic principles of the organization and administration of health programs; leadership skills; grant writing. Prerequisite: PHE 101. S.

PHE 304. Health Program Planning, Implementation, and Evaluation. 3 Credits. 
This course is designed to prepare public health educators to plan, implement, and evaluate health education programs that are context sensitive, culturally relevant, and technologically appropriate to the setting, the population of potential learners, and the resources available. Additionally, concepts and theories essential to program evaluation are highlighted. Prerequisites: Public Health Education major, PHE 101, and PHE 301. S, even years.
PHE 305. Research Methods in Kinesiology & Public Health Education. 3 Credits.
This course will engage students to understand and evaluate research in kinesiology and public health education. Quantitative and qualitative research methodology will be discussed. Prerequisites: Public Health Education or Kinesiology Major, PHE 101, and PHE 102. S.

PHE 306. Epidemiology and Biostatistics. 3 Credits.
An introduction to epidemiology and biostatistics in public health. Prerequisites: Public Health Education Major, PHE 101, PHE 102 and MATH 103. S.

PHE 307. Methods and Materials of Health Education. 3 Credits.
Principles and application of methodology for educating about health; learning styles; development of computer-generated learning materials; selection, utilization, and evaluation of resources. Prerequisite: PHE 101. F.

PHE 308. Health Policy, Law, and Ethics. 3 Credits.
The purpose of this course is to introduce students to the legal and ethical issues impacting the administration and delivery of health care services. Health policy will examine the governmental role in health and in the provision of health care. Health policies, law, and ethics have a profound effect on quality of life. Accessibility, cost, quality of health care; safety of food, water, and environment; the right to make decisions about our health; these issues are vitally tied to health policies, law, and ethics. Prerequisites: PHE 101 and PHE 102. S.

PHE 309. Introduction to Human Disease. 3 Credits.
Fundamental principles relating to etiology, nature, prevention, and control of communicable and non-communicable diseases in human populations. Special emphasis on human physiology, disease prevention and health promotion in the high-risk diseases of modern, industrialized society. Prerequisites: PHE 101 and PHE 102. F.

PHE 415. Public Health Internship. 1-12 Credits.
A supervised practical experience designed to provide the student the opportunity to apply the knowledge and skills learned through their public health coursework. Prerequisites: Public Health Education major, PHE 301, PHE 302, PHE 303, PHE 304, PHE 305, PHE 306, and PHE 307. Repeatable to 12 credits. S/U grading. F,S,SS.

PHE 499. Special Topics in Public Health Education. 1-6 Credits.
Investigation of special topics in the study of public health education not included in current departmental course offerings. Specific topic will vary from offering to offering at the discretion of the department. Prerequisites: Consent of Instructor. Repeatable to 6 credits. On demand.

Bachelor of Science in Kinesiology

Required 120 credits (36 of which must be numbered 300 or above), including:

I. Essential Studies Requirements (see University ES listing).

II. The College of Education and Human Development Requirements.

III. Prerequisite courses and requirements, 19 credits, including: (some of these courses may be used to satisfy the Essential Studies requirements).

1. Criminal Background Check
2. Coursework:
   3. MATH 103 College Algebra 3
   4. BIOL 150 General Biology I 3
   5. BIOL 150L General Biology I Laboratory 1
   6. ANAT 204 Anatomy for Paramedical Personnel & 204L and Anatomy for Paramedical Personnel Laboratory 5
   7. PPT 301 Human Physiology 4
   8. PHE 102 Epidemiology in Public Health 3

Total Credits 19

KIN pre-majors should see the KIN undergraduate advisor for requirements and application for KIN major status.

IV. KIN core requirements, 47 credits including:

KIN 207 Prevention, Care and Legal Issues for Injury 3
KIN 240 Introduction to Wellness 2
KIN 242 Introduction to Kinesiology 2
KIN 276 Motor Learning & 276L and Motor Learning Lab 3
KIN 326 Fundamentals of Physical Conditioning 3
KIN 332 Biomechanics 3
KIN 332L and Biomechanics Laboratory 3
KIN 355 Applied Motor Development 3
KIN 401 Sport Sociology 3
KIN 402 Exercise Physiology & 402L and Exercise Physiology Laboratory 4
KIN 404 Adapted Physical Activity 3
KIN 440 Sport Psychology 3
KIN 446 Exercise Testing and Prescription 3
KIN 491 Senior Capstone 3
PHE 101 Introduction to Public Health 3
PHE 305 Research Methods in Kinesiology & Public Health Education 3
PHE 306 Epidemiology and Biostatistics 3

Total Credits 47

V. One of the following options:
A. Teacher Education/Certification (120 credits)

Students seeking certification to teach physical education must be admitted to the Teacher Education program which requires a minimum of 2.75 GPA, adequate test scores, and at least 30 credits before applying for admission to Teacher Education. Students must also complete the KIN core requirements (listed above) plus additional courses specific to the preparation for teaching in physical education, including the following courses:

1. T&L 250 Introduction to Education 3
2. T&L 252 Child Development 3
3. T&L 339 Educational Technology 2
4. T&L 433 Multicultural Education 3
5. KIN 220-238 (Movement Performance and Analysis courses) 6
6. KIN 305 Health/Physical Education for Early Childhood and Elementary Education Teachers 3
7. KIN 400 Methods and Materials for Teaching Physical Education Elementary School 2
8. KIN 400L Methods and Materials for Teaching Physical Education in the Elementary School-Laboratory 2
9. KIN 410 Methods and Materials for Teaching Physical and Health Education in the Secondary School 3
10. KIN 410L Methods and Materials for Teaching Physical & Health Education in the Secondary School-Laboratory 1
11. KIN 420 Curriculum Development for Physical and Health Education 3

Additional requirements for the teacher education/certification option include:

1. Admission to the Teacher Education program (see details under the College of Education and Human Development (https://education.und.edu) or on the Teacher Education website.) Note that many upper division courses are not open to students until they gain TE admission.
2. Student teaching at two levels: elementary and secondary (8 credits each, totaling 16 credits).
3. KIN 220-238, Movement Performance and Analysis courses, 6 credits total (2 individual sports/activities, 2 team sports, 1 aquatics, 1 outdoor pursuits).

B. Related Areas

KIN core requirements, plus the following:

1. Students will complete another major and/or minor in a subject area related to kinesiology.
2. KIN 220-238: Movement Performance and Analysis courses, 3 credits total (1 individual sport/activity, 1 team sports, 1 aquatics).
3. The remaining credits to satisfy the University minimum Graduation Requirements of 120 credits will be chosen from elective courses with the consent of the adviser.

C. Kinesiology Applications Area

KIN core requirements, plus the following:

1. Required Internship (KIN 497 for 10 credits) or Internship (KIN 497 for 7 credits) and Practicum (KIN 498 for 3 credits).
2. Required courses include:
   3. KIN 110 First Aid and CPR 1
   4. KIN 114 Strength Training I 1
   5. KIN 220-238 (1 aquatic, 1 individual sport/activity & 1 team sport) 3

4. Electives (a minimum of 5 credits from the following):
   5. N&D 240 Fundamentals of Nutrition 3
   7. KIN 234 Strength Training: Movement Performance and Analysis (MP&A) 1
   8. KIN 375 Exercise and Weight Training Skills and Teaching Techniques 3
   9. KIN 376 Essentials of Personal Training 3

Kinesiology applications area prepares students for the National Strength and Conditioning Association certification exams in strength and conditioning, and personal training.

D. Allied Health

1. KIN core requirements, plus the following:
2. KIN 220-238: Movement Performance and Analysis, 3 credits total (1 individual sport/activity, 1 team sports, 1 aquatics)
3. A pre-professional program in pre-med, pre-physical therapy, pre-occupational therapy, pre-chiropractic, pre-physician assistant or other approved pre-allied health science fields.

E. Accelerated Bachelor's/Master's Program (ABM)

The Accelerated Bachelor’s/Master’s (ABM) degree program allows exceptional undergraduate students an opportunity to complete the requirements for both the bachelor’s and master’s degrees at an accelerated pace. These students may double count up to 12 graduate-level credits and obtain a master's degree within 12 months of completing the bachelor's degree.

Paths to ABM Entry:

Path one (direct admit for high school student): Student eligibility requirements

- A prospective student that meets the eligibility requirements above should schedule a meeting with his/her Department Chair and/or Director of the Graduate Program to develop a plan of work for his/her bachelor’s and master’s degree programs.

- Before admission to an ABM program can be finalized, students must submit, while still an undergraduate, the standard application for admission to the School of Graduate Studies, including an application, application fee, personal statement, and transcripts. Individual departments may choose to require GRE scores or other information.

- A Program of Study, signed by the applicant, the Department Chair, and the Director of the Graduate Program must be submitted.

- The Program of Study must clearly indicate:
  - The courses (a maximum of 12 graduate credits) that will be double counted for both bachelor’s and master’s degrees.
  - That students, prior to completion of the bachelor’s degree, will not take more than 50% of their semester credits at the graduate level, to maintain undergraduate financial aid status.
  - The courses that will be taken after being accepted into the graduate program.
  - The graduation date for the master’s degree that meets the time limit for the ABM program (i.e. completing the non-thesis master’s degree within 12 months).

- After review of the materials submitted by the Department Chair and Director of the Graduate Program to the School of Graduate Studies, a letter of acceptance (or denial) to the master’s program, contingent upon meeting the ABM requirements, is issued.

- Applications accepted for admission to the Graduate Program will not be matriculated until completion of the bachelor's degree.

Requirements for Completion of the Accelerated Bachelor's/Master's Degree Program:

- Students must complete the bachelor’s degree prior to entering the master’s program. Students in the ABM may not elect to bypass the bachelor’s degree.

- Students must maintain a cumulative GPA of 3.0/4.0 at UND to remain eligible for the ABM degree program.

- Students must maintain a cumulative GPA of 3.0/4.0 or better in the double counted graduate level courses.

- No more than twelve (12) credits of graduate work may be counted toward the requirements of both degrees.

- Students must complete the master’s degree within 12 months from the completion of the bachelor’s degree for the master’s degree.

Continuing Eligibility for Accelerated Bachelor’s/Master’s Degree Programs:

- If a student completes the bachelor’s degree requirements with a cumulative GPA of less than 3.0/4.0, then he/she needs program approval to continue to pursue the ABM degree program.

- If a student becomes ineligible to participate in the ABM degree program, the Director of the Graduate Program must inform the student, the Department Chair, and the School of Graduate Studies in writing of his/her ineligibility.

- A student who is ineligible to participate in (or withdraws from) the ABM program, cannot double count any courses for both bachelor’s and master’s degrees.

Exceptions to the Accelerated Bachelor's/Master's Degree Program Time Limits:

The School of Graduate Studies may grant exception to the above time limits. The Dean will consider and evaluate the specific nature of the extenuating circumstances and the compelling reasons that prompted the Director of the Graduate Program and/or the advisory committee to make the request. Requests may be submitted formally and should explain the extenuating circumstances and provide a reasonable timeline for completing the work within the limits of the extension.

Accelerated Bachelor's/Master's Application:
Bachelor of Science in Public Health Education (B.S.P.H.E.)

Required 120 credits (36 credits numbered 300 or above and 30 credits from UND) including:

I. Essential Studies Requirements, 39 credits. The program includes the 39 credits that all students are required to complete in order to meet Essential Studies requirements (see University ES listing).

- BIOL 111 or BIOL 150: Concepts of Biology 3
- BIOL 111L or BIOL 150L: General Biology I Laboratory 1
- KIN 491: Senior Capstone 3

II. Health-Related Core Requirements, 15 credits, including:

- PHE 101: Introduction to Public Health 3
- PHE 102: Epidemiology in Public Health 3
- PHE 103: Introduction to Global Health 3
- KIN 110: First Aid and CPR 1
- KIN 240: Introduction to Wellness 2
- N&D 240: Fundamentals of Nutrition 3

Total Credits: 15

III. One of the following options:

A. Public Health Education (42 credits)

- PHE 301: Principles and Foundation of Health Education 3
- PHE 302: Community Health 3
- PHE 303: Organization and Administration of Community Health Programs 3
- PHE 304: Health Program Planning, Implementation, and Evaluation 3
- PHE 305: Research Methods in Kinesiology & Public Health Education 3
- PHE 306: Epidemiology and Biostatistics 3
- PHE 307: Methods and Materials of Health Education 3
- PHE 308: Health Policy, Law, and Ethics 3
- PHE 309: Introduction to Human Disease 3
- PHE 415: Public Health Internship 12
- COMM 345: Social Media Strategy 3

Total Credits: 42

Additional requirement for public health education option includes:

1. A minor OR 24 credits of courses, related to public health education.

B. School Health Education:

Students seeking certification to teach health education must be admitted to the Teacher Education program which requires a minimum of 2.75 GPA, adequate test scores, and at least 30 credits before applying for admission to Teacher Education. Students must also complete the PHE prerequisites and core requirements (listed above) plus additional courses specific to the preparation for teaching in health education, including the following courses:

- KIN 402: Exercise Physiology 3
- KIN 403: Adapted Physical Activity 3
- KIN 404: Community Health 3
- KIN 405: Health Program Planning, Implementation, and Evaluation 3
- KIN 406: Research Methods in Kinesiology & Public Health Education 3
- KIN 407: Methods and Materials of Health Education 3
- KIN 408: Health Education for Early Childhood and Elementary Education Teachers 3
- KIN 409: Fundamentals of Physical Conditioning 3
- KIN 410: Applied Motor Development 3
- KIN 411: Exercise Physiology 3

Minor in Athletic Coaching

Required 20 credits, including:

- KIN 207: Prevention, Care and Legal Issues for Injury 3
- KIN 210: Introduction to Coaching 2
- KIN 235: Youth and Children in Sport 3
- KIN 236: Fundamentals of Physical Conditioning 3
- KIN 404: Adapted Physical Activity 3
- KIN 440: Sport Psychology 3
- KIN 498: Practicum 3

Total Credits: 20

Minor in Public Health

Required 15 credits, including:

- PHE 101: Introduction to Public Health 3
- PHE 102: Epidemiology in Public Health 3
- PHE 103: Introduction to Global Health 3
- PHE 301: Principles and Foundation of Health Education 3
- PHE 304: Health Program Planning, Implementation, and Evaluation 3

6 credits from the following group:

- PHE 302: Community Health 3
- PHE 303: Organization and Administration of Community Health Programs 3
- PHE 305: Research Methods in Kinesiology & Public Health Education 3
- KIN 307: Methods and Materials of Health Education 3
- KIN 308: Health Policy, Law, and Ethics 3
- KIN 309: Introduction to Human Disease 3
- KIN 325: Prevention, Care and Legal Issues for Injury 3
- N&D 341: Community Nutrition I 3
- N&D 240: Fundamentals of Nutrition 3
- SOC 352: Aging and Society 3
- SOC 355: Drugs and Society 3
Languages: Department of Modern and Classical Languages & Literatures (Lang)

B.A. with a Major in Languages (p. 142)
B.A. with a Major in Languages/Teacher Certification (p. 142)
B.A. with a Major in Chinese Studies (p. 140)
B.A. with a Major in Classical Studies (p. 140)
B.A. with a Major in French (p. 141)
B.A. with a Major in German Studies (p. 142)
B.A. with a Major in Norwegian (p. 143)
B.A. with a Major in Spanish (p. 143)
Minor in Chinese Studies: Language and Culture (p. 144)
Minor in Classical Studies (p. 144)
Minor in French (p. 144)
Minor in German (p. 145)
Minor in Norwegian (p. 145)
Minor in Spanish (p. 145)
Certificate in Chinese (p. 143)
Certificate in Classical Studies (p. 143)
Certificate in French (p. 143)
Certificate in German (p. 143)
Certificate in Norwegian (p. 144)
Certificate in Spanish (p. 144)

CHIN Courses

CHIN 101. First Year Chinese I. 4 Credits.
Fundamentals of Chinese grammar, oral use of the language and reading of easy Chinese. F.

CHIN 102. First Year Chinese II. 4 Credits.
Continued study of fundamentals of Chinese grammar, oral use of the language and reading of easy Chinese. Prerequisite: CHIN 101 with a grade of C or better. S.

CHIN 201. Second Year Chinese I. 4 Credits.
Bringing students' Chinese proficiency to the intermediate level through intensive training in reading, writing, listening and speaking. Prerequisite: CHIN 102 or an equivalent approved by the department. F.

CHIN 202. Second Year Chinese II. 4 Credits.
Bringing students' Chinese proficiency to the intermediate level through intensive training in reading, writing, listening and speaking. Prerequisite: CHIN 201 or an equivalent approved by the department. S.

CHIN 303. Chinese Overseas Immersion. 3-12 Credits.
This course, offered in China/Taiwan allows further improvement in Chinese language proficiency and significant understanding of Chinese culture through coursework and first-hand experience. Repeatable to 24 credits. Repeatable to 24 credits. F.S.

CHIN 305. Chinese Culture Through Films. 3 Credits.
Help students understand traditional and modern Chinese cultural values through examining films and readings. F.

CHIN 306. Introduction to Chinese Calligraphy. 3 Credits.
Provide students significant exposure to Chinese culture through appreciation of a variety of script styles and practice in Kaishu "block." S.

CHIN 312. Topics in Chinese Culture. 3 Credits.
Introduction to various aspects of Chinese culture. Repeatable to 9 credits when topics vary. Repeatable to 9 credits. On demand.

CHIN 405. Traditional Chinese Literature in Translation. 3 Credits.
Introduction to genres and topics in Chinese literature, and significant pre-1911 Chinese works. Repeatable to 9 credits when topics vary. Repeatable to 9 credits. F, even years.

CHIN 406. Modern Chinese Literature in Translation. 3 Credits.
Introduction to genres and topics in Chinese literature, significant post-1911 Chinese writers and their works. Repeatable to 9 credits when topics vary. Repeatable to 9 credits. F, odd years.

CHIN 498. Senior Project. 1 Credit.
A capstone project designed by students, in consultation with their advisor, which reflects an integrated knowledge of various aspects of Chinese culture. Prerequisites: Senior standing and completion of coursework for Chinese Studies major or consent of Chinese Studies advisor. S/U grading. F.S,SS.

CLAS Courses

CLAS 101. First Year Latin I. 4 Credits.
Introduction to Latin grammar and syntax, with selected readings from ancient authors. F.

CLAS 102. First Year Latin II. 4 Credits.
Continued study of Latin grammar and syntax, with selected readings from ancient authors. Prerequisite: CLAS 101 with a grade of a C or better. S.

CLAS 151. First Year Greek I. 4 Credits.
Introduction to ancient Greek grammar and syntax, with selected readings from ancient authors. On demand.

CLAS 152. First Year Greek II. 4 Credits.
Continued study of ancient Greek grammar and syntax, with selected readings from ancient authors. Grade of 'C' or better in CLAS 151 recommended. Prerequisite: CLAS 151 with a grade of a C or better. On demand.

CLAS 185. Introduction to Classical Mythology. 3 Credits.
Study of literary and artistic representations of Greek and Roman mythology. Different methods of interpreting myths will also be explored. These include anthropological, philosophical and psychological approaches. On demand.

CLAS 201. Second Year Latin I. 4 Credits.
Conclusion of basic grammar and introduction to Latin authors, such as Cicero, Nepos, Petronius, or Phaedrus. Prerequisite: CLAS 202 or an equivalent approved by the department. F.

CLAS 202. Second Year Latin II. 4 Credits.
Readings in Latin literature such as the works of Catullus, Ovid, or Vergil. Prerequisite: CLAS 201 or an equivalent approved by the department. S.
CLAS 211. Masterpieces Greek and Roman Literature in Translation. 3 Credits.
This course will introduce students to a wide range of classical literature from ancient Greece and Rome. We will survey major authors from the following genres: epic, lyric, tragedy, comedy, history, philosophy, and oratory. These works will provide a window to Greek and Roman history, culture, and society. In our engagement with these texts we will attempt to understand them both in their own times and in our era, where they have long been fundamental to liberal studies. All readings are in English translation. On demand.

CLAS 251. Second Year Greek I. 4 Credits.
Conclusion of basic grammar and introduction to ancient Greek authors, such as Plato, Lysias, Xenophon, or Euripides. Prerequisite: CLAS 152 or an equivalent approved by the department. On demand.

CLAS 252. Second Year Greek II. 4 Credits.
Selected readings from works of ancient Greek literature, such as Homer's Iliad or Plato's Ion. May be repeated, with permission of the instructor, up to eight credits. Prerequisite: CLAS 251 or an equivalent approved by the department. Repeatable to 8 credits. On demand.

CLAS 262. Greek and Roman Epic in Translation. 3 Credits.
The ancient Greek and Roman tradition of epic poetry preserves some of the earliest, most influential examples of Western literature. This course examines the development of the Greco-Roman epic genre in the context of the political and social world of the Mediterranean region from its origins in oral performance traditions in the Bronze Age to the Roman Imperial period. Readings will focus on Homer's and Hesiod's poetry, Apollonius' Hellenistic epic Argonautica, and the Roman epics of Virgil and Ovid. All readings are in English. On demand.

CLAS 301. Latin Prose. 3 Credits.
Readings from major prose authors, such as Apuleius, Cicero, Sallust, Seneca, Livy, Petronius or Tacitus. Prerequisite: CLAS 202 or an equivalent approved by the department. Repeatable to 6 credits. On demand.

CLAS 311. Ancient Greek Theater. 3 Credits.
The playwrights fifth-century BCE Athens composed dramas whose beauty, elegance, and potency have endured into the twenty-first century. This course surveys the remaining works of the four greatest Athenian playwrights-the tragedians Aeschylus, Sophocles, and Euripides, and the comedian Aristophanes-in an effort to discover the mysteries and the continuing appeal of ancient Greek theater. Students will approach the plays from different perspectives and contexts-mythological, historical, cultural, theatrical, and more-in order to understand how they functions both as myth and as social commentary. All readings are in English. On demand.

CLAS 364. Special Topics in Classical Literature. 3 Credits.
Study of a specific author, genre (e.g. epic, tragedy, comedy), or special theme (e.g., war, the perception of women) in Greek and/or Latin literature. May be repeated, with change of topic, up to 9 hours. Repeatable to 9 credits. On demand.

CLAS 404. Latin Poetry. 3 Credits.
Readings from major Latin poets such as Vergil, Horace, Catullus, Ovid, Juvenal, Martial, Plautus or Terence. Repeatable to 9 credits. Prerequisite: CLAS 202 or an equivalent approved by the department. Repeatable to 9 credits. On demand.

CLAS 491. Seminar in Latin Literature. 3 Credits.
Close translation and critical analysis of a major work of Latin literature. Students will be encouraged to pursue their own topics of interest and to develop those topics into an oral presentation and/or paper. Repeatable to 6 credits. Prerequisite: CLAS 202 or an equivalent approved by the department. Repeatable to 6 credits. On demand.

CLAS 494. Individual Greek and Latin Readings. 1-4 Credits.
Topic to be determined by the interest of the student and instructor. May be taken only with the consent of the department. May be repeated up to a total of 8 credit hours. Prerequisite: CLAS 202 or CLAS 252 or an equivalent approved by the department. Repeatable to 8 credits. On demand.

FREN Courses

FREN 101. First Year French I. 4 Credits.
Introduction to speaking, reading, writing and listening comprehension with a focus on understanding the diversity of our world's natural heritage as found in the Francophone world. F,S.

FREN 102. First Year French II. 4 Credits.
A continuation of the fundamentals of speaking, reading, writing and listening comprehension with a focus on world issues arising in Francophone countries from the encounter between cultural heritage and natural heritage. Prerequisite: FREN 101 with a grade of a C or better, French placement exam or consent of instructor. F,S.

FREN 201. Second Year French I. 4 Credits.
Fundamentals of French grammar with emphasis on speaking, reading, writing and listening comprehension and a focus on Francophone world organizations and the solutions they offer to world issues. This course is taught primarily in French. Prerequisite: FREN 102 with a grade of a C or better, French placement exam or consent of instructor. F.

FREN 202. Second Year French II. 4 Credits.
Review of the structure of the French language, continued practice of oral and written expression, introduction to phonetics, and Francophone literatures as a reflection of culture. This course is taught primarily in French. Prerequisite: FREN 201 with a grade of a C or better, French placement exam or consent of instructor. S.

FREN 301. Third Year French I. 3 Credits.
Review of French grammar with an emphasis on written expression and a focus on readings, films and cultures. This course is taught in French. Prerequisite: FREN 202 with a grade of a C or better, French placement exam or consent of instructor. F.

FREN 302. Third Year French II. 3 Credits.
Review of French grammar with an emphasis on oral expression, phonetics and pronunciation and a focus on readings, films and cultures. This course is taught in French. Prerequisite: FREN 202 with a grade of a C or better, French placement exam or consent of instructor. S.

FREN 305. French Conversation and Culture. 3 Credits.
The study of concepts helpful in describing contemporary cultures and their applications to addressing contemporary issues from both domestic and global perspectives in the francophone world. Prerequisite: FREN 202 with a grade of a C or better. French placement exam or consent of instructor. F.

FREN 306. French Conversation and Culture II. 3 Credits.
Contemporary world issues of the French speaking world with an emphasis on oral and written expression. Prerequisite: FREN 202 with a grade of a C or better, French placement exam or consent of instructor. S.

FREN 307. A Social and Cultural History of Québec. 3 Credits.
This course focuses on the case of Québec as an example of North American cultural diversity. It addresses how geography, history, language, ideology, religion and ethnicity help explain cultural differences and their construction of a cultural state. Prerequisite: FREN 202 with a grade of a C or better. French placement exam or consent of instructor. On demand.

FREN 340. Business French. 3 Credits.
Oral and written practice with terminology and idioms used in commerce and business correspondence. Readings on such topics as banking, employment, markets, production, services, trade and practices in the French business world. Prerequisite: FREN 301 with a grade of a C or better, French placement exam or consent of instructor. On demand.

FREN 371. Studies in European Francophone Literatures, Films and Cultures. 3 Credits.
Topics for this course may include genre studies, survey of literary and social/political movements, or a specific time period. Depending on the topic and range of interest outside the major, the course may be taught in French or English. For major or minor credit, written work must be done in French. Repeatable up to 6 credits when course content differs. Prerequisite: FREN 202 with a grade of a C or better, French placement exam or consent of instructor. Repeatable to 6 credits. On demand.

FREN 372. Studies in African, Asian, Caribbean, and/or Polynesian Francophone Literatures, Films and Cultures. 3 Credits.
Topics for this course may include genre studies, survey of literary and social/political movements, or a specific time period. Depending on the topic and range of interest outside the major, the course may be taught in French or English. For major or minor credit, written work must be done in French. Repeatable up to 6 credits when course content differs. Prerequisite: FREN 202 with a grade of a C or better, French placement exam or consent of instructor. Repeatable to 6 credits. On demand.
FREN 373. North American Francophone Cultures through Literature and Film. 3 Credits.
A study of issues relating to being francophone in North America, the course examines North American francophone cultural diversity and concepts of difference as seen in literature and film drawn from Quebec, the maritimes, the Canadian prairie provinces, the MiddleWest, New England and Louisiana. Topics for this course may include genre studies, survey of literary and or social/political movements, or a specific time period. Depending on the topic and the range of interest outside the major, the course may be taught in French or English. For major or minor credit written work must be done in French. Repeatable up to 6 credits when course content differs. Prerequisite: FREN 202 with a grade of a C or better. French placement exam or consent of instructor. Repeatable to 6 credits. On demand.

FREN 413. Advanced French Grammar Review. 3 Credits.
An oral and written approach to French grammar and stylistics. Prerequisite: FREN 302 or equivalent. On demand.

FREN 491. Seminar in French and Francophone Studies. 1-3 Credits.
Topics for this course may include genre studies, survey of literary and or social/political movements, a specific author, or a specific time period. Depending on the topic and the range of interest outside the major, the course may be taught in French or English. For major or minor credit, written work must be done in French. May be repeated up to 12 credits. Prerequisite: FREN 202 with a grade of a C or better, French placement exam or consent of instructor. Repeatable to 12 credits. On demand.

FREN 494. Individual French Readings. 1-3 Credits.
For major or minor credit, written work must be done in French. Topics vary with individual interests and needs and may include genre studies, survey of literary and or social/political movements, or a specific time period. May be repeated to a total of six hours. Prerequisite: FREN 202 with a grade of C or better or consent of the instructor. Repeatable to 6 credits. F,S.

GERM Courses

GERM 101. First Year German I. 4 Credits.
Fundamentals of German grammar, oral use of the language and reading of easy German. F,S.

GERM 102. First Year German II. 4 Credits.
Continued study of fundamentals of German grammar, oral use of the language and reading of easy German. Prerequisite: GERM 101 with a grade of C or better. F,S.

GERM 201. Second Year German I. 4 Credits.
Review of the structure of the language, practice in oral and written expression and reading in German. Prerequisite: GERM 102, or equivalent. F.

GERM 202. Second Year German II. 4 Credits.
Review of the structure of the language, practice in oral and written expression and reading in German. Prerequisite: GERM 201 or equivalent. S.

GERM 206. Germany in a Global World. 3 Credits.
Cultural history course exploring the significant past and present global impact of Germany in areas such as aviation history, engineering, scientific innovation and discovery, psychology, politics, music, and the fine arts. No knowledge of German required. On demand.

GERM 304. German Phonetics: History, Dialect, and the Living Language. 3 Credits.
Intensive pronunciation practice leading to proper German sound articulation and to a thorough knowledge of the principles of German pronunciation and intonation. Prerequisite: GERM 201 or equivalent. On demand.

GERM 306. Contextualizing Culture: Introduction to German Studies. 3 Credits.
Interdisciplinary introduction to German Cultural Studies examines the historical development of the modern German nation as reflected in its cultural artifacts: literature, film, architecture, advertising, and visual art. No knowledge of German required. On demand.

GERM 307. Communicating Cultures I. 3 Credits.
Cultures of German-speaking countries are explored through conversation and composition. Prerequisite: GERM 202 or equivalent. F.

GERM 308. Communicating Cultures II. 3 Credits.
Cultures of German-speaking countries are further explored through conversation and composition. Prerequisite: GERM 307 or equivalent. S.

GERM 310. Screening German Cultures. 3 Credits.
Film course treating topics such as (but not limited to): film movements, cinematic adaptations of literary texts, specific directors, Oscar contenders, and the East German film company DEFA. Prerequisite: GERM 202 with a grade of C or better. On demand.

GERM 404. German Stories, German Histories. 3 Credits.
Topics vary: Literary periods and genres, individual authors, or interdisciplinary projects. Repeatable when topics vary. Repeatable to 9 credits. Prerequisite: GERM 308 or equivalent. Repeatable to 9 credits. On demand.

GERM 405. Mediating Cultures: Social Discourse in German-Speaking Countries. 3 Credits.
An exploration of German language media, focusing on social issues, such as multiculturalism, German politics, Germany and the European Union. Prerequisite: GERM 308. On demand.

GERM 406. Literary Voices in Translation. 3 Credits.
Introduction to masterpieces of German, Austrian, and Swiss literature in English. Possible course topics include Holocaust literature, the Grimms’ fairy tales, the monstrous, the uncanny, and the fantastic. Repeatable to 9 credits when topics vary. Repeatable to 9 credits. On demand.

GERM 409. Madness and Genius: An Introduction to German Intellectual History. 3 Credits.
Introduction to major intellectual, literary, and artistic movements of German-speaking cultures from Middle Ages to the present, with emphasis on the historical and philosophical environments in which they came to being. Prerequisite: GERM 308 with a grade of C or better. On demand.

GERM 413. Advanced German Grammar Review. 3 Credits.
Written composition and oral practice, with a review of those aspects of grammar which need most practice on the advanced level. Prerequisite: GERM 308 or equivalent. F.

GERM 494. Individual German Readings. 1-3 Credits.
May be repeated to a total of six hours. Prerequisites: GERM 308 and consent of the department. Repeatable to 6 credits. F,S.

LANG Courses

LANG 101. First Year Foreign Language I. 4 Credits.
Study of the fundamentals of grammar, oral use, and reading of a non-English language. Course credits available to students who demonstrate proficiency in a non-English language not offered at the university. Students who believe they may be eligible for these credits should contact the Department of Modern Classical Languages Literatures for information regarding the course. These credits may or may not fulfill language requirements in majors or programs with such requirements; students should consult with their major department for such a determination. S/U grading. On demand.

LANG 102. First Year Foreign Language II. 4 Credits.
Continued study of the fundamentals of grammar, oral use, and reading of a non-English language. Course credits available to students who demonstrate proficiency in a non-English language not offered at the university. Students who believe they may be eligible for these credits should contact the Department of Modern Classical Languages Literatures for information regarding the course. These credits may or may not fulfill language requirements in majors or programs with such requirements; students should consult with their major department for such a determination. Prerequisite: LANG 101. S/U grading. On demand.

LANG 201. Second Year Foreign Language I. 4 Credits.
Continued study of the fundamentals of grammar, oral use, and reading of a non-English language. Course credits available to students who demonstrate proficiency in a non-English language not offered at the university. Students who believe they may be eligible for these credits should contact the Department of Modern Classical Languages Literatures for information regarding the course. These credits may or may not fulfill language requirements in majors or programs with such requirements; students should consult with their major department for such a determination. Prerequisite: LANG 101 and LANG 102. S/U grading. On demand.

LANG 202. Second Year Foreign Language II. 4 Credits.
Continued study of the fundamentals of grammar, oral use, and reading of a non-English language. Course credits available to students who demonstrate proficiency in a non-English language not offered at the university. Students who believe they may be eligible for these credits should contact the Department of Modern Classical Languages Literatures for information regarding the course. These credits may or may not fulfill language requirements in majors or programs with such requirements; students should consult with their major department for such a determination. Prerequisite: LANG 101 and LANG 102. S/U grading. On demand.
LANG 202. Second Year Foreign Language II. 4 Credits.
Continued study of the fundamentals of grammar, oral use, and reading of a non-English language. Course credits available to students who demonstrate proficiency in a non-English language not offered at the university. Students who believe they may be eligible for these credits should contact the Department of Modern Classical Languages Literature for information regarding the course. These credits may or may not fulfill language requirements in majors or programs with such requirements; students should consult with their major department for such a determination. Prerequisites: LANG 101, LANG 102, and LANG 201. S/U grading. On demand.

LANG 250. Topics in World Languages and Cultures. 1-4 Credits.
Beginning or intermediate instruction on subjects not covered by regular departmental offerings. No prerequisite unless one is specifically announced in the Time Schedule. Repeatable with change of topic. Repeatable. On demand.

LANG 318. Individual Arranged Study Abroad. 1-12 Credits.
Participation in individually arranged programs of study abroad. For major or minor credit, the language used abroad must correspond to the language being studied at UND. The Department reserves the right to test the student upon his or her return to Grand Forks. Repeatable to 12 credits. Prerequisite: Permission of department. Repeatable to 12 credits. S/U grading. F,S,SS.

LANG 319. University Sponsored Study Abroad. 1-12 Credits.
Participation in UND-sponsored programs of study abroad. For major or minor credit, the language used abroad must correspond to the language being studied at UND. Repeatable when programs or topics within a program vary. Repeatable to 12 credits. Prerequisite: LANG 102 or equivalent. Repeatable to 12 credits. S/U grading. On demand.

LANG 320. Faculty-Led Study Abroad. 1-12 Credits.
Short-term, faculty-led study abroad course intended to complement our common LANG course offerings; investigation of global issues through immersion in another language and culture. Repeatable to 12 credits. On demand.

LANG 331. Foreign Literature in Translation. 1-3 Credits.
The faculty in the various foreign languages will lead reading and discussion in English of representative translations from their fields of specialty. Course may be taken in partial fulfillment of the Humanities requirement, but would not apply toward a language major or minor. Topics to be announced. Repeatable to 6 credits. Repeatable to 6 credits. F,S.

LANG 333. Colloquium In Lang & Letters. 1-3 Credits.
Prerequisite: LANG 102 or equivalent. Repeatable to 12 credits.

LANG 380. Global Gateways. 3 Credits.
An introduction to the interdisciplinary nature of cultural practices and traditions around the world, this course will explore the understanding of culture as historical, literary, linguistic, visual, and performative. Through reading, writing, and discussion to foster advanced communication, students will be expected to engage and examine intercultural contexts and complexities. Repeatable when topics vary. Repeatable to 6 credits. F,S.

LANG 389. Honors Tutorial. 1-4 Credits.
Supervised independent study of topics of mutual interest to students and members of the departmental faculty. May apply toward graduation with Senior Honors. Prerequisite: LANG 302 or equivalent and consent of department. On demand.

LANG 397. Cooperative Education. 1-6 Credits.
Compensated and practical work experience in various areas of the language of study. Coop credits may not be substituted for any required course. Repeatable to 6 credits. Prerequisites: Recommendation of language unit and approval of Department. Repeatable to 6 credits. S/U grading. F,S,SS.

LANG 400. Methods and Materials of Teaching Middle and Secondary School Foreign Language. 3 Credits.
Various teaching methods, strategies and materials used in teaching middle and secondary school foreign language. Prerequisite: T&L 345. Corequisite: T&L 486. F.

LANG 480. Capstone: Global Connections. 3 Credits.
Open to majors and non-majors. Literature, linguistics and/or culture course organized by genre, movement, topic or period with a focus on promoting complex engagement with the subject through in-depth analytical writing and discussion. Taught in English. Prerequisite: Second semester Junior, or Senior status, or instructor approval. Repeatable to 6 credits. F,S.

LANG 489. Senior Honors Thesis. 1-15 Credits.
Supervised independent study culminating in a thesis. Repeatable to 15 credits. Prerequisites: Consent of Department and approval of the honors committee. F,S.

LING Courses
LING 450. Articulatory Phonetics. 2 Credits.
Introduction to the theory and practice of articulatory phonetics. SS.
LING 451. Phonology I. 3 Credits.
Introduction to phonological analysis; intensive practice in applying theoretical principles to problem solving and to field techniques. Prerequisite: LING 450 or with permission of the instructor. ENGL 209 as a prerequisite and LING 450 as a corequisite. SS.
LING 452. Syntax and Morphology I. 3 Credits.
Fundamentals of analyzing the grammatical and morphological structures of languages; analytical skills developed through graded problems based on a wide variety of languages. SS.
LING 455. Phonetics of Signed Languages. 2 Credits.
Introduction to the theory and practice of sign language phonetics. Intensive drill in recognition and production of a wide range of manual and non-manual phonetic elements that are used in natural signed languages, along with terminology for describing those elements precisely. Practice in reading and writing one or more notational systems that are useful in recording phonetic details when conducting research on signed languages. SS.
LING 470. Introduction to Sociolinguistics and Language Development. 2 Credits.
Introduction to language variation as influenced by social interaction, with special attention to participatory language development in multilingual societies. SS.
LING 480. Learner-Directed Second Language Acquisition. 3 Credits.
Equips the student for success in learner-directed acquisition of language/culture without dependence on formal classroom instruction, especially in little-studied languages with few or no published pedagogical resources. The core of the course is an intensive practicum (40-45 hours), working with a native speaker of a language that is very different from languages the student already knows, in sessions led first by a teaching assistant and later by students. Separate lecture-discussion sessions present the theoretical foundation for the practicum. An understanding of second language acquisition is instilled that combines Sociocultural Theory with the psycholinguistic study of comprehension and production along with a detailed multiphase strategy for long-term language/culture learning. Corequisite recommended: LING 450 or LING 455. SS.

NORW Courses
NORW 101. First Year Norwegian I. 4 Credits.
Introduction to the basic Norwegian language skills: reading, writing, speaking and listening; fundamentals of grammar. F.
NORW 102. First Year Norwegian II. 4 Credits.
Basic Norwegian language skills; continuation of fundamentals of grammar. Prerequisite: NORW 101 with a grade of C or better. S.
NORW 201. Second Year Norwegian I. 4 Credits.
Selected cultural and literary readings, review of the structure of the language, and continued development of reading, writing, speaking, and listening skills. Prerequisite: NORW 102 or equivalent. F.
NORW 202. Second Year Norwegian II. 4 Credits.
Selected cultural and literary readings, continued review of the structure of the language and development of language skills. Prerequisite: NORW 201 or equivalent. S.
NORW 350. Norwegian Culture. 3 Credits.
Taught in English. Open to non-majors. A systematic analysis of Norwegian culture through the centuries. Repeatable when topics vary. Repeatable. F.
NORW 403. Great Literary Works of Norway. 3 Credits.
Taught in English. Open to non-majors. Reading and analysis of selected texts by a major Norwegian author. Repeatable when topics vary. Repeatable. S.
NORW 431. Advanced Norwegian. 3 Credits.
Reading of selected works by leading Norwegian authors, interpretation and discussion. Prerequisite: NORW 202 or equivalent. F.
NORW 432. Advanced Norwegian. 3 Credits.
Reading of selected works by leading Norwegian authors, interpretation and discussion. Prerequisite: NORW 202. S.

NORW 433. Norwegian Literature. 3 Credits.
Norwegian literature, with special attention given to recognized masterpieces, past and present. Prerequisite: NORW 202. F.

NORW 434. Norwegian Literature. 3 Credits.
Norwegian literature with special attention given to recognized masterpieces, past and present. Prerequisite: NORW 202. S.

NORW 494. Individual Norwegian Readings. 1-3 Credits.
May be repeated to a total of six hours. Prerequisites: Six credits of other 400-level Norwegian courses and consent of department. Repeatable to 6 credits. F,S.

SPAN Courses

SPAN 101. First Year Spanish I. 4 Credits.
Pronunciation and fundamental grammatical principles introduced through the development of skill and listening comprehension and speaking, followed by practice in reading and writing. F,S.

SPAN 102. First Year Spanish II. 4 Credits.
Continued study of pronunciation and fundamental grammatical principles through the development of skill in listening comprehension and speaking, followed by practice in reading and writing. Prerequisite: SPAN 101 with a grade of a C or better. S,SS.

SPAN 201. Second Year Spanish I. 4 Credits.
Review of the structure of the language, readings in Spanish, practice in oral and written expression. Prerequisite: SPAN 102 or an equivalent approved by the department. F,SS.

SPAN 202. Second Year Spanish II. 4 Credits.
Review of the structure of the language, readings in Spanish, practice in oral and written expression. Prerequisite: SPAN 201 or an equivalent approved by the department. S,SS.

SPAN 304. Spanish Phonetics. 3 Credits.
A theoretical and practical approach to Spanish pronunciation. Prerequisite: SPAN 202 or equivalent or permission of instructor. On demand.

SPAN 308. Spanish Conversation. 3 Credits.
Practice in a variety of forms of oral Spanish. Prerequisite: SPAN 202 or an equivalent approved by the department. On demand.

SPAN 309. Spanish Composition. 3 Credits.
Practice in a variety of forms of written Spanish. Prerequisite: SPAN 202 or an equivalent approved by the department. On demand.

SPAN 312. Spanish for the Professions. 3 Credits.
A study of terminologies, cultural contexts, and professional etiquette. Topics will vary. Prerequisites: SPAN 202 or equivalent and permission of instructor. On demand.

SPAN 420. Early Spanish Literature & Culture. 3 Credits.
Lectures, readings, analysis and discussion of representative Early Spanish literary cultural texts. Students will be expected to engage the texts by examining intellectual histories, cultural contexts and complexities of social power and difference as an artistic expression of the human experience. Repeatable when topics vary. Prerequisite: SPAN 308 or SPAN 309, with preference for SPAN 309. On demand.

SPAN 421. Modern & Contemporary Spanish Literature & Culture. 3 Credits.
Lectures, readings, analysis and discussion of representative Modern Contemporary Spanish literary cultural texts. Students will be expected to engage the texts by examining intellectual histories, cultural contexts and complexities of social power and difference as an artistic expression of the human experience. Repeatable when topics vary. Prerequisite: SPAN 308 or SPAN 309, with preference for SPAN 309. On demand.

SPAN 422. Early Latin American Literature & Culture. 3 Credits.
Lectures, readings, analysis and discussion of representative Early Latin American literary cultural texts. Students will be expected to engage the texts by examining intellectual histories, cultural contexts and complexities of social power and difference as an artistic expression of the human experience. Repeatable when topics vary. Prerequisite: SPAN 308 or SPAN 309, with preference for SPAN 309. On demand.

SPAN 423. Modern & Contemporary Latin American Literature & Culture. 3 Credits.
Lectures, readings, analysis and discussion of representative Modern Contemporary Latin American literary cultural texts. Students will be expected to engage the texts by examining intellectual histories, cultural contexts and complexities of social power and difference as an artistic expression of the human experience. Repeatable when topics vary. Prerequisite: SPAN 308 or SPAN 309, with a preference for SPAN 309. On demand.

SPAN 450. Advanced Spanish Grammar. 3 Credits.
An in-depth examination of the grammar of the Spanish language. Emphasis will be placed on those elements of Spanish which present the greatest difficulties for native speakers of English. Prerequisite: SPAN 309 or permission of instructor. S.

SPAN 462. Seminar in Hispanic Literature, Culture and Linguistics. 3 Credits.
Advanced work on a specific aspect of the Hispanic literary, linguistic, and/or cultural tradition. Repeatable with different topic. Prerequisite: SPAN 308 or SPAN 309, with preference for SPAN 309. Repeatable. On demand.

SPAN 494. Individual Hispanic Readings. 1-3 Credits.
Independent study on specific topic pre-arranged with professor. Prerequisites: Span 307 or equivalent and consent of the department. Repeatable to 3 credits. F,S.

Bachelor of Arts with a Major in Chinese Studies

Required: 40 credits distributed between Parts A and B as follows:

Part A: Required courses (22 credits)

CHIN 101 First Year Chinese I 4
CHIN 102 First Year Chinese II 4
CHIN 201 Second Year Chinese I 4
CHIN 202 Second Year Chinese II 4
LANG 380 Global Gateways 3
LANG 480 Capstone: Global Connections 3

Part B: Study or internship in China/area studies (18 credits)

Select six of the following: 18

CHIN 303 Chinese Overseas Immersion
CHIN 305 Chinese Culture Through Films
CHIN 306 Introduction to Chinese Calligraphy
CHIN 312 Topics in Chinese Culture
CHIN 405 Traditional Chinese Literature in Translation
CHIN 406 Modern Chinese Literature in Translation
HIST 362 Modern China
RELS 315
RELS 380
PHIL 383
GEOG 463 Regional Geography (China)
BADM 316 Introduction to Business in China
BADM 318 China Then and Now
BADM 319 Business Fieldwork in Shanghai
BADM 497 Internship in China (S/U only)

Other courses may be substituted with the consent of the Chinese Studies academic advisor.

Bachelor of Arts with a Major in Classical Studies

Required: 43 credits distributed among Parts A (16 credits), B (21 credits) and C (6 credits):

I. Essential Studies Requirements (see University ES listing).

**Part A: Language requirement**

*Option 1, Latin*

- CLAS 101  First Year Latin I  4
- CLAS 102  First Year Latin II  4
- CLAS 201  Second Year Latin I  4
- CLAS 202  Second Year Latin II  4

*Option 2, Greek*

- CLAS 151  First Year Greek I  4
- CLAS 152  First Year Greek II  4
- CLAS 251  Second Year Greek I  4
- CLAS 252  Second Year Greek II  4

*Option 3, Greek and Latin*

- CLAS 101  First Year Latin I  4
- CLAS 102  First Year Latin II  4
- CLAS 151  First Year Greek I  4
- CLAS 152  First Year Greek II  4

*Part B: Courses in classical civilization, literature, culture*

Select seven of the following:

- CLAS 185  Introduction to Classical Mythology  3
- CLAS 211  Masterpieces Greek and Roman Literature in Translation  3
- CLAS 262  Greek and Roman Epic in Translation  3
- CLAS 301  Latin Prose  3
- CLAS 311  Ancient Greek Theater  3
- CLAS 364  Special Topics in Classical Literature  3
- CLAS 404  Latin Poetry  3
- HIST 101  Western Civilization I  3
- HIST 301  The Medieval World  3
- HIST 343  Ancient Greece  3
- HIST 344  Ancient Rome  3
- HIST 345  The Ancient Near East  3
- HUM 102  The Human Community  3
- PHIL 300  History of Philosophy I (Ancient/Modern)  3
- PHIL 301  History of Philosophy II (Medieval/19th Century)  3
- POLS 310  Introduction to Political Thought  3
- RELS 231  Christian Scripture/New Testament  3
- RELS 328  Development of Christian Doctrine  3

Additional 100- and 200-level Latin courses, other than those used to satisfy Part A

Additional 100- and 200-level Greek courses, other than those used to satisfy Part A

Other courses as approved by Classical Studies adviser

*Part C*

- LANG 380  Global Gateways  3
- LANG 480  Capstone: Global Connections  3

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A B.A. with a major in French includes four introductory lower-division courses and a minimum of 24 credits at the 300 and 400 levels. Students are required to take a minimum of two 300/400 level courses in each of the categories below as well as LANG 380 and LANG 480.

*lower division courses*

- FREN 101  First Year French I  4
- FREN 102  First Year French II  4
- FREN 201  Second Year French I  4
- FREN 202  Second Year French II  4

The program offers upper-division courses in the following categories:

**Category 1: the study and practice of spoken and written French in national and international contexts**

- FREN 301  Third Year French I  3
- FREN 302  Third Year French II  3
- FREN 305  French Conversation and Culture  3
- FREN 306  French Conversation and Culture II  3
- FREN 307  A Social and Cultural History of Québec  3
- FREN 340  Business French  3
- LANG 318  Individual Arranged Study Abroad  1-12
- LANG 319  University Sponsored Study Abroad  1-12
- FREN 413  Advanced French Grammar Review  3
- FREN 494  Individual French Readings  1-3

**Category 2: an interdisciplinary approach to the study of Francophone literatures and films**

- FREN 301  Third Year French I  3
- FREN 302  Third Year French II  3
- FREN 305  French Conversation and Culture  3
- FREN 306  French Conversation and Culture II  3
- FREN 307  A Social and Cultural History of Québec  3
- FREN 340  Business French  3
- LANG 318  Individual Arranged Study Abroad  1-12
- LANG 319  University Sponsored Study Abroad  1-12
- FREN 413  Advanced French Grammar Review  3
- FREN 494  Individual French Readings  1-3

**Category 3: the understanding and analysis of Francophone perspectives regarding socio-cultural contemporary world issues**

- FREN 305  French Conversation and Culture  3
- FREN 306  French Conversation and Culture II  3
- FREN 307  A Social and Cultural History of Québec  3
- LANG 318  Individual Arranged Study Abroad  1-12
- LANG 319  University Sponsored Study Abroad  1-12
- FREN 371  Studies in European Francophone Literatures, Films and Cultures  3
- FREN 372  Studies in African, Asian, and/or Polynesian Francophone Literatures, Films and Cultures  3
- FREN 373  North American Francophone Cultures through Literature and Film  3
- FREN 491  Seminar in French and Francophone Studies  1-3
- FREN 494  Individual French Readings  1-3

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**Bachelor of Arts with a Major in French**

The French program offers a wide range of courses emphasizing language acquisition and an understanding of international cultural diversity. To achieve these goals, students learn to communicate in French and to address issues of cultural diversity as drawn from literature, film, and other forms of contemporary media from the cultural production of the more than 50 French-language countries of the world. The program offers upper-division courses in the following categories: the study and practice of spoken and written French in national and international contexts, an interdisciplinary approach to the study of Francophone literatures and films, and the understanding and analysis of Francophone perspectives regarding socio-cultural contemporary world issues.
Bachelor of Arts with a Major in German Studies

A major in German Studies consists of:

Four introductory lower-division courses:
- GERM 101 First Year German I (4)
- GERM 102 First Year German II (4)
- GERM 201 Second Year German I (4)
- GERM 202 Second Year German II (4)

27 total credits required

12 must come from the following:
- GERM 307 Communicating Cultures I (3)
- GERM 308 Communicating Cultures II (3)
- LANG 380 Global Gateways (3)
- LANG 480 Capstone: Global Connections (3)

15 elective credits from the following:
- GERM 304 German Phonetics: History, Dialect, and the Living Language (3)
- GERM 310 Screening German Cultures (3)
- GERM 404 German Stories, German Histories (3)
- GERM 405 Mediating Cultures: Social Discourse in German-Speaking Countries (3)
- GERM 409 Madness and Genius: An Introduction to German Intellectual History (3)
- GERM 413 Advanced German Grammar Review (3)
- LANG 318 Individual Arranged Study Abroad (1-12)
- LANG 319 University Sponsored Study Abroad (1-12)

Outside of LANG 380 Global Gateways and LANG 480 Capstone: Global Connections, only 3 credits from GERM coursework can be taught in English.

Majors and minors are encouraged to make their interests known early in their academic career, including the desire to study in a German-speaking country, particularly for programs administered through partner institutions. In addition to the department-wide Arneberg and Larsen scholarships, the German Program, awards the Max Kade, Stoltz and Rogers scholarships as well as the Boswau Endowment Fund exclusively to qualified students of German.

Bachelor of Arts with a Major in Languages

Required 120 credits (36 of which must be numbered 300 or above, and 30 of which must be from UND) including:

I. Essential Studies Requirements (see University ES listing).

II. Major Curriculum Listed Under Specific Language.

Optional Sub-Plan in Peace Studies

The Peace Studies courses listed below may be taken either as elective courses or as part of a plan of study leading to the B.A. degree with a major in Languages: Peace Studies, administered through the Department of Modern & Classical Languages & Literatures. The Peace Studies courses are taught by faculty members from the departments of Geography, Philosophy & Religion, History, Education, Economics, English, Psychology, Sociology, Languages, and the natural and physical sciences. Their goal is to encourage critical scholarly thinking and action by students and faculty in the growing areas of interest in issues of peace, war, social justice and human rights. They are excellent preparation for graduate study in a range of legal, governmental, social service, educational, theological and international fields.

The major requires a total of 36 credits, including all the following courses, except for the Independent Study. If one or more courses are not offered within the timeframe that students have for their graduation, they may take alternative courses with the permission of the Program Director, who serves as the academic advisor to Peace Studies students. Other courses may be selected by the student in consultation with the advisor to focus on an area of interest, e.g., courses from the Chinese Studies minor or other international or environmental topics.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>GEOG 161</td>
<td>World Regional Geography</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 250</td>
<td>Introduction to Geopolitics</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 120</td>
<td>Introduction to Ethics</td>
<td>3</td>
</tr>
<tr>
<td>HUM 283</td>
<td>Evidenced Based Reasoning Across Disciplines</td>
<td>3</td>
</tr>
<tr>
<td>HIST 335</td>
<td>Nuclear Weapons and the Modern Age</td>
<td>3</td>
</tr>
<tr>
<td>IDS 495</td>
<td>Service and Citizenship</td>
<td>3</td>
</tr>
<tr>
<td>or HUM 408</td>
<td>Writing Across the Disciplines</td>
<td>3</td>
</tr>
</tbody>
</table>

Bachelor of Arts with a Major in Languages/Teacher Certification

Through a partnership with the College of Education and Human Development and the Department of Teaching and Learning, students may seek teacher licensure in a language. The following program of study must be completed:

I. Requirements for the B.A. with a major in a Language.

II. Humanities requirements:
- HIST 101 Western Civilization I (3)
- HIST 102 Western Civilization II (3)
- English courses beyond College Composition II (4)

Total Credits 10

III. Additional requirements for licensure in French, German or Spanish
- Phonetics (with grade no lower than B) (2)
- Advanced Grammar (with grade no lower than B) (2)

A course in civilization of the country or countries in which the language is spoken is also strongly recommended.

IV. Admission to the Teacher Education program, normally while taking T&L 250 Introduction to Education. (See College of Education and Human Development [https://education.und.edu] for admission and licensing requirements.)

V. The program in Secondary Education, to include:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>T&amp;L 250</td>
<td>Introduction to Education</td>
<td>3</td>
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<tr>
<td>T&amp;L 252</td>
<td>Child Development</td>
<td>3</td>
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<tr>
<td>T&amp;L 319</td>
<td>Integrating Diverse Needs in Educational Settings</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 339</td>
<td>Educational Technology</td>
<td>2</td>
</tr>
<tr>
<td>T&amp;L 345</td>
<td>Curriculum, Instruction, and Assessment</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 386</td>
<td>Field Experience</td>
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</tr>
<tr>
<td>LANG 400</td>
<td>Methods and Materials of Teaching Middle and Secondary School Foreign Language</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 432</td>
<td>Learning Environments</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 433</td>
<td>Multicultural Education</td>
<td>3</td>
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<tr>
<td>T&amp;L 486</td>
<td>Field Experience</td>
<td>1</td>
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<tr>
<td>T&amp;L 487</td>
<td>Student Teaching **</td>
<td>16</td>
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<tr>
<td>T&amp;L 488</td>
<td>Senior Seminar</td>
<td>1</td>
</tr>
</tbody>
</table>

Total Credits 42

* T&L 390 Special Topics, may be taken as an elective (supervised by Languages Department Faculty)
** A full semester of student teaching, normally taken during the semester of graduation

Language majors seeking teacher licensure must have an adviser in both the Languages Department and the Department of Teaching and Learning.
Bachelor of Arts with a Major in Norwegian

A major in Norwegian includes four introductory courses (NORW 101, 102, 201, 202) and a minimum of 24 credit hours of upper-division courses. Credits for the major can be selected from the following upper-division courses: NORW 350, 403, 431, 432, 433, 434; 6 of the 24 credits must consist of LANG 380 and the departmental capstone, LANG 480. With departmental approval, NORW 430, 403, 431, 432, 433, 434; 6 of the 24 credits must consist of LANG 380 and for the major can be selected from the following upper-division courses: NORW 201, 202) and a minimum of 24 credit hours of upper-division courses. Credits major in Spanish includes four introductory courses (SPAN 101, 102, 201, 202) and a minimum of 24 credit hours of upper-division courses. Credits for the major can be selected from the following upper-division courses: SPAN 494 and LANG 318 and 319 may also count toward the major. With departmental approval, NORW 480. 

### Four introductory courses
- **NORW 101** First Year Norwegian I 4
- **NORW 102** First Year Norwegian II 4
- **NORW 201** Second Year Norwegian I 4
- **NORW 202** Second Year Norwegian II 4

### Upper division courses (minimum 24 credit hours)
- **NORW 350** Norwegian Culture 3
- **NORW 403** Great Literary Works of Norway 3
- **NORW 431** Advanced Norwegian 3
- **NORW 432** Advanced Norwegian 3
- **NORW 433** Norwegian Literature 3
- **NORW 434** Norwegian Literature 3
- **LANG 380** Global Gateways (Required) 3
- **LANG 480** Capstone: Global Connections (Required) 3

(with departmental approval the following may count towards the major)
- **LANG 318** Individual Arranged Study Abroad 1-12
- **LANG 319** University Sponsored Study Abroad 1-12
- **NORW 494** Individual Norwegian Readings 1-3

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Bachelor of Arts with a Major in Spanish

A major in Spanish consists of:

### Four introductory lower division courses
- **SPAN 101** First Year Spanish I 4
- **SPAN 102** First Year Spanish II 4
- **SPAN 201** Second Year Spanish I 4
- **SPAN 202** Second Year Spanish II 4

### Upper division courses (27 credits)
- **SPAN 308** Spanish Conversation 3
- **SPAN 309** Spanish Composition 3
- **SPAN 462** Seminar in Hispanic Literature, Culture and Linguistics 3
- **LANG 380** Global Gateways 3
- **LANG 480** Capstone: Global Connections 3

Select 6 credits from the following:
- **SPAN 304** Spanish Phonetics 3
- **SPAN 450** Advanced Spanish Grammar 3

Select 6 credits from the following:
- **SPAN 420** Early Spanish Literature & Culture 3
- **SPAN 421** Modern & Contemporary Spanish Literature & Culture 3
- **SPAN 422** Early Latin American Literature & Culture 3
- **SPAN 423** Modern & Contemporary Latin American Literature & Culture 3

Elective: Select 3 credits from SPAN 300/400 level courses as an elective or choose from the list below. Note that courses are not repeatable unless topics vary.
- **LANG 319** University Sponsored Study Abroad 1-12
- **SPAN 494** Individual Hispanic Readings (with Departmental approval) 1-3

A major in Spanish with an emphasis in teaching consists of:

### Four introductory lower division courses
- **SPAN 101** First Year Spanish I 4
- **SPAN 102** First Year Spanish II 4
- **SPAN 201** Second Year Spanish I 4
- **SPAN 202** Second Year Spanish II 4

### Upper division courses (27 credits)
- **SPAN 304** Spanish Phonetics 3
- **SPAN 308** Spanish Conversation 3
- **SPAN 309** Spanish Composition 3
- **SPAN 450** Advanced Spanish Grammar 3
- **SPAN 462** Seminar in Hispanic Literature, Culture and Linguistics 3
- **LANG 380** Global Gateways 3
- **LANG 480** Capstone: Global Connections 3

Select 6 credits from the following:
- **SPAN 420** Early Spanish Literature & Culture 3
- **SPAN 421** Modern & Contemporary Spanish Literature & Culture 3
- **SPAN 422** Early Latin American Literature & Culture 3
- **SPAN 423** Modern & Contemporary Latin American Literature & Culture 3

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Certificate in Chinese

Students who test out of language are eligible for the certificate if they complete a minimum of 4 credit hours at the 202 level. Those who major or minor in the language remain eligible for the certificate. Students will receive a certificate in Chinese for completing 16 credits:

- **CHIN 101** First Year Chinese I 4
- **CHIN 102** First Year Chinese II 4
- **CHIN 201** Second Year Chinese I 4
- **CHIN 202** Second Year Chinese II 4

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Certificate in Classical Studies

Students who test out of language are eligible for the certificate if they complete a minimum of 4 credit hours at the 102 or 152 level. Those who major or minor in the language remain eligible for the certificate. Students will receive a certificate in Classical Language for completing 16 credits:

- **CLAS 101** First Year Latin I 4
- **CLAS 102** First Year Latin II 4
- **CLAS 151** First Year Greek I 4
- **CLAS 152** First Year Greek II 4

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Certificate in French

Students who test out of language are eligible for the certificate if they complete a minimum of 4 credit hours at the 202 level. Those who major or minor in the language remain eligible for the certificate. Students will receive a certificate in French for completing 16 credits:

- **FREN 101** First Year French I 4
- **FREN 102** First Year French II 4
- **FREN 201** Second Year French I 4
- **FREN 202** Second Year French II 4

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Certificate in German

Students who test out of language are eligible for the certificate if they complete a minimum of 4 credit hours at the 202 level. Those who major or minor in the language remain eligible for the certificate. Students will receive a certificate in German for completing 16 credits:

- **GERM 101** First Year German I 4
- **GERM 102** First Year German II 4
Certificate in Norwegian

Students who test out of language are eligible for the certificate if they complete a minimum of 4 credit hours at the 202 level. Those who major or minor in the language remain eligible for the certificate. Students will receive a certificate in Norwegian for completing 16 credits:

- CLAS 101 First Year Norwegian I 4
- CLAS 102 First Year Norwegian II 4
- CLAS 201 Second Year Norwegian I 4
- CLAS 202 Second Year Norwegian II 4

Certificate in Spanish

Students who test out of language are eligible for the certificate if they complete a minimum of 4 credit hours at the 202 level. Those who major or minor in the language remain eligible for the certificate. Students will receive a certificate in Spanish for completing 16 credits:

- SPAN 101 First Year Spanish I 4
- SPAN 102 First Year Spanish II 4
- SPAN 201 Second Year Spanish I 4
- SPAN 202 Second Year Spanish II 4

Minor in Chinese Studies: Language and Culture

Required: 23 credits distributed between Parts A and B as follows:

**Part A: Language Requirements**

- CHIN 101 First Year Chinese I 4
- CHIN 102 First Year Chinese II 4

**Part B: Area Studies**

Select five of the following: 15

- CHIN 201 Second Year Chinese I
- CHIN 202 Second Year Chinese II
- CHIN 303 Chinese Overseas Immersion
- CHIN 305 Chinese Culture Through Films
- CHIN 306 Introduction to Chinese Calligraphy
- CHIN 312 Topics in Chinese Culture
- CHIN 405 Traditional Chinese Literature in Translation
- CHIN 406 Modern Chinese Literature in Translation
- HIST 362 Modern China
- RELS 315
- RELS 380
- PHIL 383
- GEOG 463 Regional Geography (China)

Total Credits 23

Other courses may be substituted with the consent of the Chinese Studies academic advisor.

Minor in Classical Studies

Required: 28 credits distributed between Parts A and B as follows:

**Part A: Language requirement**

**Option 1, Latin**

- CLAS 101 First Year Latin I 4
- CLAS 102 First Year Latin II 4
- CLAS 201 Second Year Latin I 4

**Option 2, Greek**

- CLAS 151 First Year Greek I 4
- CLAS 152 First Year Greek II 4
- CLAS 251 Second Year Greek I 4
- CLAS 252 Second Year Greek II 4

**Option 3, Greek and Latin**

- CLAS 101 First Year Latin I 4
- CLAS 102 First Year Latin II 4
- CLAS 151 First Year Greek I 4
- CLAS 152 First Year Greek II 4

**Part B**

Select four of the following: 12

- CLAS 185 Introduction to Classical Mythology
- CLAS 211 Masterpieces Greek and Roman Literature in Translation
- CLAS 262 Greek and Roman Epic in Translation
- CLAS 301 Latin Prose
- CLAS 311 Ancient Greek Theater
- CLAS 364 Special Topics in Classical Literature
- CLAS 404 Latin Poetry
- HIST 101 Western Civilization I
- HIST 301 The Medieval World
- HIST 343 Ancient Greece
- HIST 344 Ancient Rome
- HIST 345 The Ancient Near East
- HUM 102 The Human Community
- LANG 480 Capstone: Global Connections
- PHIL 300 History of Philosophy I (Ancient/Modern)
- PHIL 301 History of Philosophy II (Medieval/19th Century)
- RELS 231 Christian Scripture/New Testament
- RELS 328 Development of Christian Doctrine

Additional 100- and 200-level Latin courses, other than those used to satisfy Part A.

Additional 100- and 200-level Greek courses, other than those used to satisfy Part A.

Other courses as approved by Classical Studies adviser

* i.e., a student may not use the same courses to satisfy Part A and Part B.

** A student may fulfill the language requirement in one of three ways.

*** 9 of these credits must be at the Upper Division level (300 or above).

Minor in French

A minor in French includes four introductory lower-division courses and a minimum of 15 credits at the 300 and 400 levels.

- FREN 101 First Year French I 4
- FREN 102 First Year French II 4
- FREN 201 Second Year French I 4
- FREN 202 Second Year French II 4

Students are required to take a minimum of one 300/400 level course in each of the categories. The capstone course may be used to fulfill the minor but is not required. The majority of 300/400 level courses have the potential to fulfill more than one category. Therefore, once a course has been designated, either by the student or the advisor, as fulfilling the requirements in one category, it may not also be used to fulfill the requirements of a second category.

Students are encouraged to participate in programs of travel and study in one or more French speaking countries. Credits earned on such programs may be counted toward a major or a minor in French. However, all majors and minors are required to take on campus a minimum of one course in each of the three areas (see above), regardless of the number of credits acquired through transfer, including study abroad.
### Minor in German

A minor in German consists of:

#### Four introductory lower-division courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GERM 101</td>
<td>First Year German I</td>
<td>4</td>
</tr>
<tr>
<td>GERM 102</td>
<td>First Year German II</td>
<td>4</td>
</tr>
<tr>
<td>GERM 201</td>
<td>Second Year German I</td>
<td>4</td>
</tr>
<tr>
<td>GERM 202</td>
<td>Second Year German II</td>
<td>4</td>
</tr>
</tbody>
</table>

#### Upper-division courses (minimum 12 credit hours)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GERM 307</td>
<td>Communicating Cultures I</td>
<td>3</td>
</tr>
<tr>
<td>GERM 308</td>
<td>Communicating Cultures II</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Electives

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GERM 304</td>
<td>German Phonetics: History, Dialect, and the Living Language</td>
<td>3</td>
</tr>
<tr>
<td>GERM 404</td>
<td>German Stories, German Histories</td>
<td>3</td>
</tr>
<tr>
<td>GERM 409</td>
<td>Madness and Genius: An Introduction to German Intellectual History</td>
<td>3</td>
</tr>
<tr>
<td>GERM 413</td>
<td>Advanced German Grammar Review</td>
<td>3</td>
</tr>
<tr>
<td>LANG 318</td>
<td>Individual Arranged Study Abroad</td>
<td>1-12</td>
</tr>
<tr>
<td>LANG 319</td>
<td>University Sponsored Study Abroad</td>
<td>1-12</td>
</tr>
<tr>
<td>GERM 206</td>
<td>Germany in a Global World</td>
<td>3</td>
</tr>
<tr>
<td>GERM 306</td>
<td>Contextualizing Culture: Introduction to German Studies</td>
<td>3</td>
</tr>
<tr>
<td>GERM 310</td>
<td>Screening German Cultures</td>
<td>3</td>
</tr>
<tr>
<td>GERM 405</td>
<td>Mediating Cultures: Social Discourse in German-Speaking Countries</td>
<td>3</td>
</tr>
<tr>
<td>GERM 406</td>
<td>Literary Voices in Translation</td>
<td>3</td>
</tr>
</tbody>
</table>

A maximum of one English-language course (GERM 206 Germany in a Global World, GERM 306 Contextualizing Culture: Introduction to German Studies or GERM 406 Literary Voices in Translation) may count toward the minor.

#### Leadership Minor (Lead)

**Courses**

**LEAD 101. Learning Leadership. 3 Credits.**
An introduction to leadership as a discipline including the theories of leadership, the role of leadership in history and today's society, communication and interaction with diverse individuals and groups, basic network-building concepts and assessment of application of leadership theory and skills. F.S.

**LEAD 395. Special Topics. 1-4 Credits.**
Topics will vary. Course will offer specialized knowledge in a specific area related to leadership. Prerequisite: Consent of the instructor. Repeatable to 4 credits. On demand.

**LEAD 400. Advanced Leadership. 3 Credits.**
An in-depth analysis of the applications of leadership skills in a variety of contexts, including an experiential analysis of self (and others) as a leader within context. Students will demonstrate creative and critical thinking about leadership, communicate effectively in oral and written format, and apply networking concepts and leadership skills in an applied setting. Prerequisites: LEAD 101, completion of one ethics course, and enrollment in the minor. S.

**LEAD 494. Readings in Leadership. 1-4 Credits.**
Selected readings in leadership developed individually for each student. Prerequisites: Consent of the instructor; must be enrolled in the Leadership Minor. Repeatable to 4 credits. F.S,SS.

**LEAD 497. Internship in Leadership. 1-4 Credits.**
Guided, practical experience in leadership with selected organizations. Instructor, working with others in the organization, will work to help mentor students in developing their leadership skills. Prerequisites: Must be enrolled in the leadership minor; requires consent of instructor. Repeatable to 4 credits. S/U grading. F.S,SS.

#### Minor in Norwegian

A minor in Norwegian includes:

#### Four introductory courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NORW 101</td>
<td>First Year Norwegian I</td>
<td>4</td>
</tr>
<tr>
<td>NORW 102</td>
<td>First Year Norwegian II</td>
<td>4</td>
</tr>
<tr>
<td>NORW 201</td>
<td>Second Year Norwegian I</td>
<td>4</td>
</tr>
<tr>
<td>NORW 202</td>
<td>Second Year Norwegian II</td>
<td>4</td>
</tr>
</tbody>
</table>

#### Upper division courses (minimum 12 credit hours)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NORW 350</td>
<td>Norwegian Culture</td>
<td>3</td>
</tr>
<tr>
<td>NORW 403</td>
<td>Great Literary Works of Norway</td>
<td>3</td>
</tr>
<tr>
<td>NORW 431</td>
<td>Advanced Norwegian</td>
<td>3</td>
</tr>
<tr>
<td>NORW 432</td>
<td>Advanced Norwegian</td>
<td>3</td>
</tr>
<tr>
<td>NORW 433</td>
<td>Norwegian Literature</td>
<td>3</td>
</tr>
<tr>
<td>NORW 434</td>
<td>Norwegian Literature</td>
<td>3</td>
</tr>
</tbody>
</table>

With departmental approval, NORW 494 Individual Norwegian Readings and LANG 318 Individual Arranged Study Abroad, LANG 319 University Sponsored Study Abroad and LANG 490 Capstone: Global Connections may also count toward the minor.

#### Minor in Spanish

A minor in Spanish includes 12 upper division credits beyond the four introductory lower division courses:

#### Four introductory lower division courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPAN 101</td>
<td>First Year Spanish I</td>
<td>4</td>
</tr>
<tr>
<td>SPAN 102</td>
<td>First Year Spanish II</td>
<td>4</td>
</tr>
<tr>
<td>SPAN 201</td>
<td>Second Year Spanish I</td>
<td>4</td>
</tr>
<tr>
<td>SPAN 202</td>
<td>Second Year Spanish II</td>
<td>4</td>
</tr>
</tbody>
</table>

#### Required upper division courses (6 credits)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPAN 308</td>
<td>Spanish Conversation</td>
<td>3</td>
</tr>
<tr>
<td>SPAN 309</td>
<td>Spanish Composition</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Three credits at the 400-level

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPAN 420</td>
<td>Early Spanish Literature &amp; Culture</td>
<td>3</td>
</tr>
<tr>
<td>SPAN 421</td>
<td>Modern &amp; Contemporary Spanish Literature &amp; Culture</td>
<td>3</td>
</tr>
<tr>
<td>SPAN 422</td>
<td>Early Latin American Literature &amp; Culture</td>
<td>3</td>
</tr>
<tr>
<td>SPAN 423</td>
<td>Modern &amp; Contemporary Latin American Literature &amp; Culture</td>
<td>3</td>
</tr>
<tr>
<td>SPAN 450</td>
<td>Advanced Spanish Grammar</td>
<td>3</td>
</tr>
<tr>
<td>SPAN 462</td>
<td>Seminar in Hispanic Literature, Culture and Linguistics</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Three additional elective credits from SPAN (can include LANG 319)

#### Leadership Minor (p. 145)
Emphasizing both cognitive understanding and analytical skills, the undergraduate minor in Linguistics provides an introduction to the scientific study of language, as a supplement to a student’s primary academic concentration. Its purpose is to provide a foundation for a graduate degree or other further education in linguistics or related fields, and to prepare students for informed decision-making about language-related issues in their daily life and civic responsibilities. The courses are offered in three core subfields of linguistics: phonetics, phonology, and morphology/syntax, as well as other subfields (including interdisciplinary and applied). The minor promotes familiarity with a broad range of languages, especially minority languages.

The total requirement for the minor is 20 credits, including the following:

### Prerequisites to the minor

- **ENGL 209** Introduction to Linguistics (also offered as Lang 207) 3
- 2.8 GPA and junior standing or special permission ¹

### Required core courses

- **LING 450** Articulatory Phonetics 2

## Minor in Linguistics

To be chosen in consultation with the minor advisor from courses that have significant leadership components and are educationally appropriate to meet the goals of the student and the program.

## Linguistics (Ling)

Minor in Linguistics (p. 146)

### Courses

**LING 450. Articulatory Phonetics. 2 Credits.**  
Introduction to the theory and practice of articulatory phonetics. SS.

**LING 451. Phonology I. 3 Credits.**  
Introduction to phonological analysis; intensive practice in applying theoretical principles to problem solving and to field techniques. Prerequisite: LING 450 or with permission of the instructor ENGL 209 as a prerequisite and LING 450 as a corequisite. SS.

**LING 452. Syntax and Morphology I. 3 Credits.**  
Fundamentals of analyzing the grammatical and morphological structures of languages; analytical skills developed through graded problems based on a wide variety of languages. SS.

**LING 455. Phonetics of Signed Languages. 2 Credits.**  
Introduction to the theory and practice of sign language phonetics. Intensive drill in recognition and production of a wide range of manual and non-manual phonetic elements that are used in natural signed languages, along with terminology for describing those elements precisely. Practice in reading and writing one or more notational systems that are useful in recording phonetic details when conducting research on signed languages. SS.

**LING 470. Introduction to Sociolinguistics and Language Development. 2 Credits.**  
Introduction to language variation as influenced by social interaction, with special attention to participatory language development in multilingual societies. SS.

**LING 480. Learner-Directed Second Language Acquisition. 3 Credits.**  
Equips the student for success in learner-directed acquisition of language/culture without dependence on formal classroom instruction, especially in little-studied languages with few or no published pedagogical resources. The core of the course is an intensive practicum (40-45 hours), working with a native speaker of a language that is very different from languages the student already knows, in sessions led first by a teaching assistant and later by students. Separate lecture-discussion sessions present the theoretical foundation for the practicum. An understanding of second language acquisition is instilled that combines Sociocultural Theory with the psycholinguistic study of comprehension and production along with a detailed multiphase strategy for long-term language/culture learning. Corequisite recommended: LING 450 or LING 455. SS.

## Non-core courses with linguistics content

Select three of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 229</td>
<td>Diversity in U.S. Literatures</td>
</tr>
<tr>
<td>ENGL 309</td>
<td>Modern Grammar</td>
</tr>
<tr>
<td>ENGL 370</td>
<td>Language and Culture</td>
</tr>
<tr>
<td>ENGL 417</td>
<td>Special Topics in Language</td>
</tr>
<tr>
<td>ENGL 418</td>
<td>Second Language Acquisition ²</td>
</tr>
<tr>
<td>ENGL 419</td>
<td>Teaching English as a Second Language</td>
</tr>
<tr>
<td>ENGL 442</td>
<td>History of the English Language</td>
</tr>
<tr>
<td>LING 455</td>
<td>Phonetics of Signed Languages</td>
</tr>
<tr>
<td>LING 470</td>
<td>Introduction to Sociolinguistics and Language Development</td>
</tr>
<tr>
<td>LING 480</td>
<td>Learner-Directed Second Language Acquisition</td>
</tr>
</tbody>
</table>

Other upper-division or graduate courses whose content is linguistics, subject to approval by one of the program advisors.

### Language requirement for the minor:

Three credits in a non-Indo-European language. If a suitable language is used to satisfy the language requirement of a student’s major, it may also be used to satisfy the language requirement of the minor. The following courses are among those that may be used to satisfy the language requirement:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHIN 101</td>
<td>First Year Chinese I</td>
</tr>
<tr>
<td>CHIN 102</td>
<td>First Year Chinese II</td>
</tr>
<tr>
<td>CSD 101</td>
<td>American Sign Language I</td>
</tr>
<tr>
<td>CSD 102</td>
<td>American Sign Language II</td>
</tr>
<tr>
<td>CSD 201</td>
<td>American Sign Language III</td>
</tr>
<tr>
<td>IS 250</td>
<td>Lakota Language I</td>
</tr>
<tr>
<td>IS 251</td>
<td>Lakota Languages II</td>
</tr>
<tr>
<td>IS 350</td>
<td>Native American Languages</td>
</tr>
</tbody>
</table>

**LING 480 Learner-Directed Second Language Acquisition (This course may be used to satisfy both the language requirement and the non-core requirement)** 3

### Electives  

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>LING 451</td>
<td>Phonology I</td>
</tr>
<tr>
<td>LING 452</td>
<td>Syntax and Morphology I</td>
</tr>
</tbody>
</table>

Other language courses in non-Indo-European languages may be used with the approval of a program advisor, including transfer courses.

The language requirement may also be satisfied by examination or by native competence in a suitable language, subject to approval by a program advisor.

Deaf students may, in consultation with a program advisor, substitute appropriate courses in the phonetics and phonology of sign language for LING 450 Articulatory Phonetics and LING 451 Phonology I if they also use a sign language to satisfy the non-Indo-European language requirement.

¹ SIL requires a 2.8 GPA and junior standing in order for students to take its courses. Any exceptions to these requirements would need to be granted by the SIL director.

² ENGL 418 Second Language Acquisition and LING 480 Learner-Directed Second Language Acquisition are distinct courses in content and aims. ENGL 418 Second Language Acquisition focuses more on a cognitive and theoretical understanding of second language acquisition, particularly for language teaching of world languages in a traditional classroom setting. LING 480 Learner-Directed Second Language Acquisition provides a practical approach to second language acquisition in a non-traditional, user-directed context where traditional instruction and resources are not available, as is typical in minority languages.

³ See footnote 2.

The minor is offered jointly by the English department and SIL; interested students should contact the English department for further information and advising.
Management (Mgmt)

B.B.A. with a Major in Management (p. 150)

B.B.A. with a Major in Human Resource Management (p. 150)

B.B.A. with a Major in Operations and Supply Chain Management (p. 149)

B.B.A. with a Major in Airport Management (p. 148)

B.B.A. with a Major in Aviation Management (p. 149)

Minor in Operations and Supply Chain Management (p. 151)

Courses

MGMT 300. Principles of Management. 3 Credits.
This course provides a survey of the traditional functions of management with primary emphasis on planning, organizing, controlling, and leading. This emphasis involves coverage of managerial decision making, leadership, motivation, interpersonal communication, staffing human resources, and organizational structure, design, and change and development. Additional topics include the history of managerial thought, management information systems, international management, and business ethics and social responsibility. Prerequisites or corequisites: A total of 30 or more credit hours, including courses in progress. F.S.

MGMT 301. Operations Management. 3 Credits.
This course introduces managerial issues and problems arising in the operations function of both service and manufacturing-oriented organizations. Topics include: aggregate planning, facility layout, forecasting, inventory control and management, introduction to linear programming, operations strategy, processes and technology, project management, quality control and management, scheduling, supply chain management, and waiting line analysis. Prerequisites: ECON 210 with grade of C or better, Junior or Senior standing, a GPA of 2.5, and declared COBPA majors only. F.S.

MGMT 302. Human Resource Management. 3 Credits.
A survey of the concepts, procedures, and programs associated with Human Resources Management in organizations. It includes an overview of the basic management functions and legal issues linked to the execution of the personnel functions of employment, performance appraisal, training, compensation, and development. Prerequisites: ECON 210 with grade of C or better, MGMT 300 with grade of C or better, Junior or Senior standing, and declared COBPA majors only. F.S.

MGMT 309. Quantitative Methods for Managers. 3 Credits.
Topics include decision analysis, forecasting, linear programming, integer and mixed programming, network models, queuing analysis, and simulation. Prerequisites: ECON 210 with grade of C or better, MGMT 301 with grade of C or better, Junior or Senior Standing, and declared COBPA majors only. F.S.

MGMT 310. Organizational Behavior. 3 Credits.
The objective of this course is to allow the student to become acquainted with and experience various ways of thinking about and responding to the issues of human relations and management. The course is designed to survey the following topics at the individual, group, and organizational levels: individual perceptions, attitudes, values, motivation, leadership, communication, group dynamics, and problem solving. Prerequisites: ECON 210 with grade of C or better, MGMT 300 with grade of C or better, Junior or Senior standing, and declared COBPA majors only. F.S.

MGMT 332. Purchasing. 3 Credits.
An introductory course in procurement/purchasing of products, services, equipment/technology, etc. The course addresses issues across various sectors of the economy such as services, retail, wholesale, manufacturing, government, not-for-profit, etc. Prerequisite or Corequisite: MGMT 301 with a grade of C or better. F.

MGMT 360. Business Ethics and Social Responsibility. 3 Credits.
This course explores responsible business practices at both the individual and organizational levels. Key concepts of business ethics are studied, with a focus on how managers can motivate employees and other stakeholders to support socially responsible business decisions and practices. Prerequisite: MGMT 300 with a grade of C or better. On demand.

MGMT 361. Managerial Negotiations. 3 Credits.
A survey of negotiation, mediation, arbitration, and emerging methods of alternative dispute resolution. Students will be required to engage in small and large group discussions, simulated negotiations and mediations in addition to regular reading assignments. This course is designed to help students understand their bargaining position in a variety of settings, devise negotiating strategies, and build their persuasive abilities and self-confidence in negotiations. Prerequisite: MGMT 300 with grade of C or better. On demand.

MGMT 362. Leadership and Conflict Resolution. 3 Credits.
This course will explore the nexus between leadership and the ability to navigate through the tough waters of conflict. Participants will be encouraged to reflect, explore, and apply concepts that will help them to achieve success in their professional and personal lives. On demand.

MGMT 372. Fundamentals of Project Management. 3 Credits.
This course covers the fundamental concepts and applied techniques for cost, resources, risk, scheduling, and stakeholder management of both long-term development programs and short-term projects. Project management deals with project proposals, charts, and the management of projects, those limited in scope, budget, and schedule. The course uses cases from a wide variety of industries, including construction, information systems, non-profit organizations, the government, and the military. Students will also become familiar with PM software tools and certification options. Using discussions and in group class work, students will learn how to apply the skills required of a project manager in today's climate. Prerequisite: MGMT 300 or LEAD 101 with a grade of C or better, or instructor approval. S.

MGMT 395. Special Topics. 3 Credits.
Specific topics will vary. Course will offer specialized knowledge in a specific area, e.g. Human Resource Management, Operations Management, Strategic Management. May be taken a maximum of two times for credit. Prerequisites: MGMT 300 with a grade of C or better, and declared COBPA majors; Management department may require additional prerequisites for specific sections; Management department approval. Repeatable to 6 credits. On demand.

MGMT 397. Cooperative Education. 1-2 Credits.
On-the-job compensated experience in general management or human resource management, operations or supply chain management. A maximum of 6 credits cumulative from MGMT 397 and MGMT 497 are allowed to be used towards the above mentioned degree programs. Prerequisites: MGMT 300 with a grade of C or better, GPA of 2.5 and consent of instructor. Repeatable to 6 credits. S/U grading. F.S,SS.

MGMT 400. Organizational Theory and Analysis. 3 Credits.
The course is designed to acquaint students with some of the alternative ways in which organizations may be designed to accomplish their tasks. The course reviews the development of organization theories, their current status, and their future. Emphasis is placed on the analyses of system theories pertaining to structure, process, and context. Prerequisites: MGMT 300 with grade of C or better, Junior or Senior standing, and declared COBPA majors only. Prerequisite or Corequisite: MGMT 310 with grade of C or better. F.S.

MGMT 407. Wage and Salary Administration. 3 Credits.
The role of a wage and salary administrator is studied. The course focuses on the fundamentals of wage theory, job evaluation and pricing, employee evaluation, individual and group incentive plans, benefits, and managerial/ executive compensation. Prerequisites: MGMT 302 with grade of C or better, Junior or Senior standing, and declared COBPA majors only. F.

MGMT 408. Performance Management and Human Resource Management Issues. 3 Credits.
This class explores various performance management approaches used by human resource management professionals and managers to improve work performance in organizations. This course also investigates current issues in the field of human resource management that potentially impact the performance of work. Prerequisites: MGMT 302 with grade of C or better, Junior or Senior standing, and declared COBPA majors only. S.

MGMT 409. Union-Management Relations. 3 Credits.
This course provides the student with an overview of the role of labor unions in contemporary organizations. The primary emphasis of the course is on the collective bargaining process. Students are engaged in simulated collective bargaining processes involving negotiations, mediation, arbitration, and final contractual agreements. Causes of industrial disputes and grievance arbitration are also covered. Prerequisites: MGMT 302 with a grade of C or better, Junior or Senior standing, and declared COBPA majors only. On demand.
MGMT 410. Staffing: Recruitment and Selection. 3 Credits.
This course trains students in one of the major components (applicant recruitment and selection) for Human Resource professionals as well as managers. In doing so, students are introduced to the techniques of analyzing the effectiveness and appropriateness of various instruments used by professionals. Additionally, students are introduced to the strategies associated with the use of different recruitment and selection techniques. Prerequisites: MGMT 302 with grade of C or better, Junior or Senior standing, and declared COBPA majors only. S.

MGMT 412. Training and Development. 3 Credits.
This course trains students in one of the major components (employee training and development) for Human Resource professionals as well as managers. In doing so: students are introduced to the current state of employee training and development practices; acquire a basic understanding of key issues related to the structure, the methods, and the use of technology for the training of employees; and through readings, lectures, discussions, and presentations learn to apply learning theories in the development and implementation of a strategic employee training system. Prerequisites: MGMT 302 with grade of C or better, Junior or Senior standing, and declared COBPA majors only. F.

MGMT 420. Multinational Management. 3 Credits.
This course is an introduction to the dynamics of management processes encountered in a multinational business setting. It covers comparative management systems and analysis of various environmental conditions for making effective managerial decisions within a multinational company. Adaptation to different cultures is emphasized as one of the essential components of the successful multinational management equation. Prerequisites: MGMT 300 with a grade of C or better, Junior or Senior standing, and declared COBPA majors only. On demand.

MGMT 431. Supply Chain Management. 3 Credits.
This course covers the set of approaches utilized to efficiently integrate activities of suppliers, operations/production, and distribution of goods and services. Topics include: logistics, inventory, information systems, integration, alliances, procurement, international issues, coordination of product/service and processes in a supply chain, customer value, and decision support. Prerequisites: MGMT 301 with grade of C or better and declared COBPA major. F.

MGMT 432. Supplier Relationship Management. 3 Credits.
This course focuses on the "upstream" portion of the supply chain and stresses managerial issues in supplier relations. Topics covered include: cross functional issues in supply management, social responsibility, buyer-supplier relationships, quality management, total cost of ownership, developing supply requirements, strategic sourcing, cost management, relationship management, and world-class supply management. Prerequisites: MGMT 301 with grade of C or better and declared COBPA majors. S.

MGMT 433. Logistics in the Supply Chain. 3 Credits.
The primary emphasis of this course is directed toward dealing effectively with the management problems associated with moving and storing goods throughout the supply chain. Major topics covered include: logistic network strategy and planning, transportation strategy, inventory strategy, location strategy. Prerequisites or Corequisites: MGMT 309 with grade of C or better and declared CoBPA majors. S.

MGMT 475. Strategic Management. 3 Credits.
This is the capstone course in business. Students apply knowledge gained in accounting, economics, finance, management, and marketing to develop business strategies. Case studies, simulations, and other exercises are used to develop executive skills. Prerequisites: MGMT 300, MGMT 301, FIN 310, MRKT 305, 95 credits, and declared CoBPA majors only. F.S.

MGMT 489. Senior Honors Thesis. 1-8 Credits.
Supervised independent study culminating in a thesis. Repeatable to 9 credits. Prerequisite: HON 401. Repeatable to 9 credits. F,S,SS.

MGMT 494. Readings in Management. 1-4 Credits.
Selected readings in management. Prerequisites: Senior or graduate standing and consent of instructor. Repeatable to 8 credits. F,S.

MGMT 497. Internship in Management. 1-3 Credits.
Guided, practical experience in human resource management, production, operations supply chain management, or general management, with selected participating businesses or organizations. A maximum of 6 credits cumulative from MGMT 397 and MGMT 497 are allowed to be used towards a degree program. Prerequisites: MGMT 300 with a grade of C or better, GPA of 2.5, and consent of instructor. Repeatable to 6 credits. S/U grading. F,S,SS.

Bachelor of Administration with Major in Airport Management

Airport Management Major Requirements

Required 120 credit hours (36 of which must be numbered 300 or above) including:

I. Essential Studies Requirements (see University ES listing and consult with your advisor).

II. College of Business and Public Administration Requirements:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 200</td>
<td>Elements of Accounting I</td>
</tr>
<tr>
<td>ACCT 201</td>
<td>Elements of Accounting II</td>
</tr>
<tr>
<td>ECON 201</td>
<td>Principles of Microeconomics</td>
</tr>
<tr>
<td>ECON 202</td>
<td>Principles of Macroeconomics</td>
</tr>
<tr>
<td>ECON 210</td>
<td>Introduction to Business and Economic Statistics</td>
</tr>
<tr>
<td>ISBC 217</td>
<td>Fundamentals of Computer Information Systems</td>
</tr>
<tr>
<td>FIN 310</td>
<td>Principles of Financial Management</td>
</tr>
<tr>
<td>MGMT 300</td>
<td>Principles of Management</td>
</tr>
<tr>
<td>MGMT 301</td>
<td>Operations Management</td>
</tr>
<tr>
<td>MRKT 305</td>
<td>Marketing Foundations</td>
</tr>
<tr>
<td>MGMT 475</td>
<td>Strategic Management</td>
</tr>
</tbody>
</table>

III. Aviation Required Courses:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>AVIT 100</td>
<td>Aviation Orientation</td>
</tr>
<tr>
<td>AVIT 102</td>
<td>Introduction to Aviation</td>
</tr>
<tr>
<td>AVIT 103</td>
<td>Introduction to Air Traffic Management</td>
</tr>
<tr>
<td>AVIT 208</td>
<td>Aviation Safety</td>
</tr>
<tr>
<td>AVIT 250</td>
<td>Human Factors</td>
</tr>
<tr>
<td>AVIT 311</td>
<td>Safety Management System (SMS)</td>
</tr>
<tr>
<td>AVIT 402</td>
<td>Airport Planning and Administration</td>
</tr>
<tr>
<td>AVIT 403</td>
<td>Aerospace Law</td>
</tr>
<tr>
<td>AVIT 405</td>
<td>Airline Operations and Management</td>
</tr>
<tr>
<td>AVIT 407</td>
<td>General Aviation Operations and Management</td>
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<td>AVIT 442</td>
<td>Airport Operations and Administration</td>
</tr>
<tr>
<td>AVIT 485</td>
<td>Aviation Senior Capstone</td>
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</table>

Total Credits: 31

IV. Other required courses:

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<tr>
<th>Course</th>
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<tbody>
<tr>
<td>ATSC 110</td>
<td>Meteorology I</td>
</tr>
<tr>
<td>ATSC 110L</td>
<td>Meteorology I Laboratory</td>
</tr>
<tr>
<td>ISBC 305</td>
<td>End-User Applications</td>
</tr>
<tr>
<td>MGMT 302</td>
<td>Human Resource Management</td>
</tr>
<tr>
<td>MGMT 310</td>
<td>Organizational Behavior</td>
</tr>
<tr>
<td>ACCT 315</td>
<td>Business Law I</td>
</tr>
<tr>
<td>GEOG 474</td>
<td>Introduction to Geographic Information Systems (GIS)</td>
</tr>
<tr>
<td>GEOG 474L</td>
<td>GIS Laboratory</td>
</tr>
<tr>
<td>GEOL 103</td>
<td>Introduction to Environmental Issues</td>
</tr>
</tbody>
</table>

Select one of the following: 3

- MATH 103 | College Algebra |
- MATH 146 | Applied Calculus I |
- MATH 165 | Calculus I |

Total Credits: 25-26

V. College of Business & Public Administration Graduation Requirements:

1. Earn a minimum cumulative GPA of 2.60
2. Earn a minimum UND GPA of 2.60
3. Earn a minimum cumulative major GPA of 2.60 (all courses that apply toward the degree and major)
4. Earn a minimum UND major GPA of 2.60 (all courses that apply toward the degree and major)
5. At least half of the business courses that apply toward the degree and major must be from UND

Bachelor of Business Administration with Major in Aviation Management

Aviation Management Major Requirements

Required 120 credit hours (36 of which must be numbered 300 or above)
including:

I. Essential Studies Requirements (see University ES listing and consult with your advisor).

II. College of Business and Public Administration Requirements:

<table>
<thead>
<tr>
<th>Course</th>
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</thead>
<tbody>
<tr>
<td>ACCT 200</td>
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<tr>
<td>ECON 201</td>
<td>Principles of Microeconomics</td>
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<td>Introduction to Business and Economic Statistics</td>
<td>3</td>
</tr>
<tr>
<td>ISBC 217</td>
<td>Fundamentals of Computer Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>FIN 310</td>
<td>Principles of Financial Management</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 300</td>
<td>Principles of Management</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 301</td>
<td>Operations Management</td>
<td>3</td>
</tr>
<tr>
<td>MRKT 305</td>
<td>Marketing Foundations</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 475</td>
<td>Strategic Management</td>
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III. Aviation Courses:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>AVIT 100</td>
<td>Aviation Orientation</td>
<td>1</td>
</tr>
<tr>
<td>AVIT 102</td>
<td>Introduction to Aviation</td>
<td>5</td>
</tr>
<tr>
<td>AVIT 103</td>
<td>Introduction to Air Traffic Management</td>
<td>2</td>
</tr>
<tr>
<td>AVIT 208</td>
<td>Aviation Safety</td>
<td>3</td>
</tr>
<tr>
<td>AVIT 221</td>
<td>Basic Attitude Instrument Flying</td>
<td>3</td>
</tr>
<tr>
<td>AVIT 222</td>
<td>IFR Regulations and Procedures</td>
<td>3</td>
</tr>
<tr>
<td>AVIT 250</td>
<td>Human Factors</td>
<td>2</td>
</tr>
<tr>
<td>AVIT 323</td>
<td>Aerodynamics - Airplanes</td>
<td>3</td>
</tr>
<tr>
<td>AVIT 324</td>
<td>Aircraft Systems</td>
<td>3</td>
</tr>
<tr>
<td>AVIT 325</td>
<td>Multi-Engine Systems and Procedures</td>
<td>2</td>
</tr>
<tr>
<td>AVIT 403</td>
<td>Aerospace Law</td>
<td>3</td>
</tr>
<tr>
<td>AVIT 485</td>
<td>Aviation Senior Capstone</td>
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<td>AVIT 407</td>
<td>General Aviation Operations and Management</td>
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<td>Select one of the following:</td>
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IV. Other Required Courses:

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<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MGMT 302</td>
<td>Human Resource Management</td>
<td>3</td>
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<tr>
<td>MGMT 310</td>
<td>Organizational Behavior</td>
<td>3</td>
</tr>
<tr>
<td>ACCT 315</td>
<td>Business Law I</td>
<td>3</td>
</tr>
<tr>
<td>ATSC 110</td>
<td>Meteorology I</td>
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</tr>
<tr>
<td>ATSC 110L</td>
<td>Meteorology I Laboratory</td>
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<td>ATSC 231</td>
<td>Aviation Meteorology</td>
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<td>Total Credits</td>
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Select one of the following: 3 or 4

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 103</td>
<td>College Algebra</td>
<td></td>
</tr>
<tr>
<td>MATH 146</td>
<td>Applied Calculus I</td>
<td></td>
</tr>
<tr>
<td>MATH 165</td>
<td>Calculus I</td>
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<td></td>
<td>Total Credits</td>
<td>20-21</td>
</tr>
</tbody>
</table>

V. College of Business & Public Administration Graduation Requirements:

1. Earn a minimum cumulative GPA of 2.60
2. Earn a minimum UND GPA of 2.60
3. Earn a minimum cumulative major GPA of 2.60 (all courses that apply toward the degree and major)
4. Earn a minimum UND major GPA of 2.60 (all courses that apply toward the degree and major)
5. At least half of the business courses that apply toward the degree and major must be from UND

Bachelor of Business Administration with Major in Operations and Supply Chain Management

Operations and Supply Chain Management Major Requirements

Required 120 credit hours (36 of which must be numbered 300 or above)
including:

I. Essential Studies Requirements (see University ES listing)

II. One of the following: MATH 103, or MATH 146, or MATH 165

III. College of Business & Public Administration Requirements (ALL courses must be completed with a grade of C or higher):

<table>
<thead>
<tr>
<th>Course</th>
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</thead>
<tbody>
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<td>3</td>
</tr>
<tr>
<td>ECON 210</td>
<td>Introduction to Business and Economic Statistics</td>
<td>3</td>
</tr>
<tr>
<td>ISBC 217</td>
<td>Fundamentals of Computer Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>FIN 310</td>
<td>Principles of Financial Management</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 300</td>
<td>Principles of Management</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 301</td>
<td>Operations Management</td>
<td>3</td>
</tr>
<tr>
<td>MRKT 305</td>
<td>Marketing Foundations</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 475</td>
<td>Strategic Management</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Total Credits</td>
<td>33</td>
</tr>
</tbody>
</table>

IV. Major Requirements (ALL courses must be completed with a grade of C or higher):

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 315</td>
<td>Business Law I</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 309</td>
<td>Quantitative Methods for Managers</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 332</td>
<td>Purchasing</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 372</td>
<td>Fundamentals of Project Management</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 431</td>
<td>Supply Chain Management</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 432</td>
<td>Supplier Relationship Management</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 433</td>
<td>Logistics in the Supply Chain</td>
<td>3</td>
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<td>21</td>
</tr>
</tbody>
</table>

V. Major Elective Requirements (ALL courses must be completed with a grade of C or higher):
Bachelor of Business Administration with a Major in Human Resource Management

Human Resource Management Major Requirements

Required 120 credit hours (36 of which must be numbered 300 or above) including:

I. Essential Studies Requirements (see University ES listing)

II. One of the following: MATH 103, or MATH 146, or MATH 165

III. College of Business and Public Administration Requirements (ALL courses must be completed with a grade of C or higher):

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 200</td>
<td>Elements of Accounting I</td>
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</tr>
<tr>
<td>ACCT 201</td>
<td>Elements of Accounting II</td>
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</tr>
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<td>ECON 201</td>
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<td>Principles of Macroeconomics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 210</td>
<td>Introduction to Business and Economic Statistics</td>
<td>3</td>
</tr>
<tr>
<td>ISBC 217</td>
<td>Fundamentals of Computer Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>FIN 310</td>
<td>Principles of Financial Management</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 300</td>
<td>Principles of Management</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 301</td>
<td>Operations Management</td>
<td>3</td>
</tr>
<tr>
<td>MRKT 305</td>
<td>Marketing Foundations</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits: 21

While not required, Internship in Management (MGMT 497) and, or Cooperative Education (MGMT 397) are strongly encouraged.

Select courses from the following list to complete the necessary elective credits:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 218</td>
<td>Advanced Spreadsheet Applications</td>
<td>3</td>
</tr>
<tr>
<td>ACCT 320</td>
<td>Cost Accounting</td>
<td>3</td>
</tr>
<tr>
<td>LEAD 400</td>
<td>Advanced Leadership</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 302</td>
<td>Human Resource Management</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 310</td>
<td>Organizational Behavior</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 360</td>
<td>Business Ethics and Social Responsibility</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 361</td>
<td>Managerial Negotiations</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 395</td>
<td>Special Topics</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 397</td>
<td>Cooperative Education</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 400</td>
<td>Organizational Theory and Analysis</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 420</td>
<td>Multinational Management</td>
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</tr>
<tr>
<td>MGMT 494</td>
<td>Readings in Management</td>
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<td>MGMT 497</td>
<td>Internship in Management</td>
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Total Credits: 9

IV. Major Requirements (ALL courses must be completed with a grade of C or higher):

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<th>Course Title</th>
<th>Credits</th>
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<tbody>
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<tr>
<td>ISBC 305</td>
<td>End-User Applications</td>
<td>3</td>
</tr>
<tr>
<td>LEAD 400</td>
<td>Advanced Leadership</td>
<td>3</td>
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<tr>
<td>MGMT 309</td>
<td>Quantitative Methods for Managers</td>
<td>3</td>
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<td>MGMT 409</td>
<td>Union-Management Relations</td>
<td>3</td>
</tr>
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<td>MGMT 420</td>
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</tr>
<tr>
<td>MGMT 475</td>
<td>Strategic Management</td>
<td>3</td>
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Total Credits: 33

V. Major Elective Requirements (ALL courses must be completed with a grade of C or higher):

Select courses from the following list to complete the necessary elective credits:

<table>
<thead>
<tr>
<th>Course Code</th>
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<td>Organizational Theory and Analysis</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 407</td>
<td>Wage and Salary Administration</td>
<td>3</td>
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<tr>
<td>MGMT 408</td>
<td>Performance Management and Human Resource Management Issues</td>
<td>3</td>
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<td>MGMT 410</td>
<td>Staffing: Recruitment and Selection</td>
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<td>MGMT 412</td>
<td>Training and Development</td>
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</table>

Total Credits: 21

VI. College of Business & Public Administration Graduation Requirements:

1. Earn a minimum cumulative GPA of 2.50
2. Earn a minimum UND GPA of 2.50
3. Earn a minimum cumulative major GPA of 2.50 (business administration courses that apply toward the degree and major)
4. Earn a minimum UND Major GPA of 2.50 (business administration courses that apply toward the degree and major)
5. At least half of the business courses that apply toward the degree and major must be from UND

Not all “Topics” courses offered in management may be appropriate for this major; therefore, individual “Topics” courses must be approved by the Management Department for this major.

Bachelor of Business Administration with a Major in Management

Management Major Requirements

Required 120 credit hours (36 of which must be numbered 300 or above) including:

I. Essential Studies Requirements (see University ES listing)

II. One of the following: MATH 103, or MATH 146, or MATH 165

III. College of Business & Public Administration Requirements:

<table>
<thead>
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<td>MRKT 305</td>
<td>Marketing Foundations</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits: 9

Note: Must be completed with a grade of C or higher:

1. Earn a minimum cumulative GPA of 2.50
2. Earn a minimum UND GPA of 2.50
3. Earn a minimum cumulative major GPA of 2.50 (business administration courses that apply toward the degree and major)
4. Earn a minimum UND major GPA of 2.50 (business administration courses that apply toward the degree and major)
5. At least half of the business courses that apply toward the degree and major must be from UND

Not all “Topics” courses offered in management may be appropriate for this major; therefore, individual “Topics” courses must be approved by the Management Department for this major.
Minor in Operations and Supply Chain Management

The Operations and Supply Chain Management minor provides students with a broad conceptual grounding in Operations and Supply Chain Management. The program includes significant background in management theory, practice, and skills development, providing students with managerial perspective that they will need to be successful in their careers. The minor also provides specific focus on operational issues in manufacturing and service organizations, as well as significant skill sets to facilitate operationally effective and efficient decision-making. Finally, the minor includes a balanced perspective by addressing relevant issues, practices, and principles of supplier management, supply chains, and logistics issues to assure that students are well grounded in supply chain management.

Students will be required to successfully complete all of the following courses, each of which is a 3-credit hour course.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MGMT 301</td>
<td>Operations Management</td>
<td>3</td>
</tr>
<tr>
<td>ISBC 217</td>
<td>Fundamentals of Computer Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 309</td>
<td>Quantitative Methods for Managers</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 431</td>
<td>Supply Chain Management</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 432</td>
<td>Supplier Relationship Management</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 433</td>
<td>Logistics in the Supply Chain</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 302</td>
<td>Human Resource Management</td>
<td>3</td>
</tr>
<tr>
<td>or MGMT 310 Organizational Behavior</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits: 21

Students are expected to complete the pre-requisite courses of the required courses listed above. Possible exceptions are noted below:

- ECON 210 Introduction to Business and Economic Statistics (which is a pre-requisite course for MGMT 301 Operations Management and MGMT 310 Organizational Behavior) may be waived by providing evidence of an adequate background and, or training in applied statistics to the Management Department.
- Non-CoBPA majors may request that the ISBC department waive ISBC 117 Personal Productivity with Information Technology pre-requisite requirement for ISBC 217 Fundamentals of Computer Information Systems, based upon potentially acceptable alternative coursework that the ISBC department finds acceptable. Students should contact the ISBC department with their request.
- MGMT 300 Principles of Management (which is a pre-requisite for MGMT 302 Human Resource Management and MGMT 310 Organizational Behavior) may be waived by demonstration of acceptable alternative coursework. Requests should be directed to the Management Department.

This minor will not be available to any of the following ‘Management’-oriented majors: Management, Operations and Supply Chain Management, Human Resource Management.

Marketing (MRKT)

B.B.A with Major in Marketing (p. 152)

Courses

MRKT 201. Personal Marketing. 3 Credits.
The course applies the marketing concept to understanding personal brand, social identity, and planning of career tracks. Emphasis is placed on the development of individual marketing plans during the sophomore/junior year thus initiating a systematic career planning process in the context of worldview. Career planning prior to the senior year helps incorporate internships, job shadowing, and/or cooperative education into students’ program of study. Particular emphasis is placed on the application of the marketing concepts in professional career initiation and the development and delivery of presentations to culturally diverse audiences. The course also incorporates attitude testing, mock interviews, discussion of job search using the Internet, networking, time management strategies, and portfolio development. F.S.

MRKT 305. Marketing Foundations. 3 Credits.
An overview of the scope and nature of market exchange and the buyer’s pivotal role. Prerequisites: ECON 201, Sophomore, Junior or Senior Standing, a minimum total of 45 credit hours, and declared COBPA majors only. Prerequisites or Corequisites: ACCT 201 and ECON 210. F,S,SS.

MRKT 310. Consumer Behavior. 3 Credits.
Theoretical and applied analysis of consumption-related activities of individuals. Investigations of the reasons behind and the forces influencing the selection, purchase, use, and disposal of goods and services. Prerequisites: MRKT 305, Sophomore standing or higher, and declared COBPA majors only. F.S.

MRKT 311. Professional Selling. 3 Credits.
The professional selling process including prospecting, qualifying, need-discovery and development, relationship-building, presentations, handling objections, closing, and post-sale service. Prerequisites: MRKT 305, Sophomore standing or higher, and declared COBPA majors only. F.S.

MRKT 315. Retail Management. 3 Credits.
Application of marketing and financial principles to the planning and execution of retail management. Includes analyses of relevant institutions and interest groups. Prerequisites: MRKT 305; Sophomore, Junior or Senior Standing; declared CoBPA majors only. F.S.

MRKT 325. International Marketing. 3 Credits.
Survey of international business environment, with focus on elements of international marketing practices and their management. Prerequisites: MRKT 305; Sophomore, Junior or Senior Standing; declared CoBPA majors only. F.S.

MRKT 330. Marketing Research. 3 Credits.
The research process from a marketing perspective. Addresses problem formulation, research design, methodology, and appropriate statistical methods. Application of procedures appropriate for the analysis and interpretation of marketing data. Prerequisites: MRKT 305; Sophomore, Junior or Senior Standing; declared CoBPA majors only. F.S.
MrkT 340. Integrated Marketing Communications. 3 Credits.  
This course focuses on the state-of-the-art strategic concept of integrated marketing communication (IMC). IMC incorporates advertising, sales promotions, publicity, public relations, personal selling, Internet, and any other means by which marketing information is communicated to people. The course will involve a synthesis of the theoretical, practical, and social considerations of IMC. Prerequisites: MRKT 305; Junior or Senior Standing; declared CoBPA majors only. F.S.

MrkT 347. Social Media. 3 Credits.  
This course is an in-depth look at social networks, social media platforms and online advertising to offer students an advantage in many positions involving marketing, consulting, and brand management both on the buyer and seller side of social media. Prerequisite: MRKT 305; Junior or Senior Standing; declared CoBPA majors. F.S.SS.

MrkT 386. Field Experience in Marketing. 1-8 Credits.  
Work opportunity to assist with marketing activities and understand the role of marketing for that company/organization (profit/nonprofit). Prerequisites: Minimum GPA of 2.5, MRKT 305, and consent of instructor. Repeatable to 8 credits. S/U grading. F.S.SS.

MrkT 396. Directed Studies in Marketing. 1-3 Credits.  
Research in some aspect of marketing. Written reports and collateral readings. Prerequisites: MRKT 310 and consent of instructor. F.S.SS.

MrkT 397. Cooperative Education in Marketing. 1-2 Credits.  
Compensated, on-the-job experience in various areas of marketing. Repeatable only to maximum of 8 credits. Prerequisites: MRKT 305 and consent of instructor. Repeatable to 8 credits. S/U grading. F.S.SS.

MrkT 405. Brand and Product Management. 3 Credits.  
The study of the theory and practice of managing brands and products as vital corporate assets and the focus of the marketing planning process. Prerequisites: MRKT 310 and MRKT 330; Junior or Senior Standing; declared CoBPA majors only. S.

MrkT 411. Sales Management. 3 Credits.  
The practice of sales management including sales force recruiting, training, organization, motivation, compensation, and evaluation. Prerequisites: MRKT 305 and MRKT 311; Junior or Senior Standing; declared CoBPA majors only. S.

MrkT 430. Relationship Marketing. 3 Credits.  
Relationship marketing is now a core, strategic element of virtually all marketing. Organizations increasingly stress the importance of cooperation with customers, communities, charities, and other partners. This course focuses primarily on marketing relationships in the Organization-to-Organization context. Prerequisites: MRKT 305 and MRKT 311; Junior or Senior Standing; declared CoBPA majors only. S.

MrkT 431. Customer Relationship Management (CRM). 3 Credits.  
This course examines customer relationship management (CRM) and its application in marketing, sales, and service. It will include the use of Microsoft Dynamics CRM and Microsoft Social Engagement. Effective CRM strategies help companies align business processes with customer-centric strategies using people, technology, and knowledge. Companies strive to use CRM to optimize the identification, acquisition, growth, and retention of desired customers to gain competitive advantage and maximize profit. Anyone interested in working with customers and CRM technology and would like to be responsible for the development of any major aspect of CRM will find this course beneficial. Emphasis is given on conceptual knowledge, real-world projects, and hands-on learning using Microsoft Dynamics CRM software. CRM training modules and software are used throughout the semester. Prerequisites: MRKT 305, Junior or Senior Standing, and declared CoBPA majors only. F.S.

MrkT 433. Negotiations for Sales and Relationship Managements. 3 Credits.  
The primary focus of this course is placed on the theoretical, practical and experiential learning of the negotiations skills. Emphasis is placed on the specific negotiations skills required to successfully maneuver through the negotiated buyer-seller exchange environment. Prerequisite: MRKT 311 or consent of instructor. S.

MrkT 440. Special Topics in Marketing. 3 Credits.  
Investigation of selected topics of importance to the marketing of goods, services, or ideas. May be taken a maximum of two times for credit. Prerequisites: MRKT 305; Junior or Senior Standing; declared CoBPA majors only. Repeatable to 6 credits. S.

MrkT 450. Marketing Management. 3 Credits.  
Capstone course addressing the firm’s micro and macro environments from a strategic marketing decision making perspective. Prerequisites: MRKT 305, MRKT 310, and MRKT 330; Senior Standing; declared CoBPA majors only. F.S.

MrkT 497. Internship in Marketing. 1-8 Credits.  
Compensated, practical experience with selected participating firms. Repeatable only to maximum of 8 credits. Prerequisites: 9 hours of Marketing, GPA of 2.75, and consent of instructor. Repeatable to 8 credits. S/U grading. F.S.SS.

Bachelor of Business Administration with Major in Marketing  
Required 120 credit hours (36 of which must be numbered 300 or above) including:

I. Essential Studies Requirements (see University ES listing).

II. One of the following: MATH 103, or MATH 146, or MATH 165.

III. College of Business and Public Administration Requirements:

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<td>ECON 202</td>
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<td>ECON 210</td>
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<td>MATH 103</td>
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Total Credits: 33

IV. Major Requirements:

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<td>MRKT 450</td>
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Select five of the following: 15

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<td>MRKT 440</td>
<td>3</td>
</tr>
<tr>
<td>MRKT 497</td>
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</tbody>
</table>

Total Credits: 24

V. College of Business & Public Administration Graduation Requirements:

1. Earn a minimum cumulative GPA of 2.50
2. Earn a minimum UND GPA of 2.50
3. Earn a minimum cumulative major GPA of 2.50 (business administration courses that apply toward the degree and major)
4. Earn a minimum UND major GPA of 2.50 (business administration courses that apply toward the degree and major)
5. Complete at least half of the business courses that apply toward the degree and major at UND

* No more than a total of 6 credits from MRKT 386 Field Experience in Marketing; MRKT 396 Directed Studies in Marketing; MRKT 397 Cooperative Education in Marketing; and MRKT 497 Internship in Marketing may be used to satisfy this requirement.

Mathematics (Math)

B.S. with Major in Mathematics (p. 155)

Minor in Mathematics (p. 155)

Minor in Mathematics for Elementary Education (p. 156)

Minor in Statistics (p. 156)

NOTE: PTP* indicates an appropriate score in the Placement Testing Program (PTP) is required.

Courses

MATH 103. College Algebra. 3 Credits.
Polynomial and rational functions, inverse functions, exponential and logarithmic functions, simple conics, systems of equations, determinants, arithmetic and geometric sequences, the Binomial Theorem. Sections meeting 5 days per week are offered for students determined eligible by the Math Department. Prerequisite: Appropriate score in the Placement Testing Program or MATH 103. F,S,SS.

MATH 105. Trigonometry. 2 Credits.
Angles, trigonometric functions and their inverses, solving triangles, trigonometric identities. Prerequisite: One year of high school geometry and either an appropriate score in the Placement Testing Program or MATH 93. S.

MATH 107. Precalculus. 4 Credits.
Equations and inequalities; polynomial rational, exponential, logarithmic and trigonometric functions; inverse trigonometric functions; algebraic and trigonometric methods commonly needed in calculus. Prerequisite: MATH 93 or an appropriate score in the Placement Testing Program. F,S,SS.

MATH 112. Transition to Calculus. 1 Credit.
This course is designed for students intending to take MATH 165. Calculus I who have mastered most of, but not all, the material covered in MATH 107. Pre-Calculus. Emphasis is therefore on topics such as inverse functions, partial fraction expansion, trigonometric identities, and applications of trigonometry, which are deemed most difficult for pre-calculus students. Prerequisite: MATH 107 or MATH 146 or an appropriate score in the Placement Testing Program. S/U grading. F.

MATH 115. Introduction to Mathematical Thought. 3 Credits.
The course will focus on analysis and interpretation of common types of mathematical arguments as well as having students construct their own arguments. A combination of topics will be included, such as: elementary combinatorics, probability, statistics, set theory, number theory, geometry and topology, mathematical logic, the mathematics of voting, etc. F.

MATH 146. Calculus I. 4 Credits.
A nonrigorous introduction to differential and integral calculus. Topics include limits, continuity, differentiation and integration techniques, and applications. Prerequisites: MATH 103 or an appropriate score in the Placement Testing Program. F,S,SS.

MATH 165. Calculus I. 4 Credits.
Limits, continuity, differentiation, Mean Value Theorem, integration, Fundamental Theorem of Calculus. Prerequisite: an appropriate score in the Placement Testing Program or MATH 112 or completion of MATH 107 with a grade of C or better. F,S,SS.

MATH 166. Calculus II. 4 Credits.
Techniques and applications of integration, exponential and logarithmic functions, parametric equations, infinite sequences and series. Prerequisites: Completion of MATH 165 with a grade of C or better; or permission of the Mathematics Department. F,S,SS.

MATH 207. Introduction to Linear Algebra. 2 Credits.
A computational treatment of systems of linear equations, finite dimensional vector spaces, linear transformations, determinants, matrices, eigenvalues, eigenvectors, and diagonalizability. Prerequisite: MATH 165. F,S.

MATH 208. Discrete Mathematics. 3 Credits.
Introduction to Set Theory, Functions and Relations, Permutations and Combinations, Logic, Boolean Algebra, Induction, Difference Equations. Other topics from Graphs, Finite Automata and Formal Languages. Prerequisite: an appropriate score in the Placement Testing Program or MATH 103 or MATH 107. F,S,SS.

MATH 217. Introduction to Cultural Mathematics. 3 Credits.
This course covers mathematical concepts within the context of cultures. Mathematical ideas are investigated in topics such as number systems, calendars, art, kinship relations, divination, and games. Examples are taken from cultures in many parts of the world. The main emphasis in the course is on learning how cultural activities can be considered mathematical and often include non-trivial mathematical ideas. One or more case studies of particular cultures will also be included. The case studies will consist of investigations into several cultural aspects that have mathematical connections. Prerequisite: A grade of C or better in MATH 103. S. odd years.

MATH 265. Calculus III. 4 Credits.
Multivariate and vector calculus including partial derivatives, multiple integration, line and surface integrals, Green's Theorem, Stokes' Theorem, the Divergence Theorem. Prerequisite: MATH 166. F,S,SS.

MATH 266. Elementary Differential Equations. 3 Credits.
Solution of elementary differential equations by elementary techniques. Laplace transforms, introduction to matrix theory and systems of differential equations. Prerequisites: MATH 265 and proficiency in a programming language. F,S,SS.

MATH 277. Mathematics for Elementary School Teachers. 3 Credits.
Development of the number systems used in elementary schools. Includes some methods and work with laboratory materials. For elementary education majors only. Prerequisites: Admission to Teacher Education and either an appropriate score in the Placement Testing Program or MATH 103. F,S.

MATH 308. History of Mathematics. 3 Credits.
This is a course on the conceptual and chronological history of mathematics. The course involves the interpretation and analysis of how and why mathematical ideas have developed over time, including political and cultural considerations. Topics include: numbers and counting systems, non-Western developments, mathematics of Egypt, Babylonia and Greece, early European developments, the Renaissance, the Scientific Revolution and the development of calculus, women in mathematics, twentieth century mathematics. Prerequisite: MATH 166 or equivalent, or consent of instructor. S.

MATH 315. Topics in Computational Mathematics. 1-3 Credits.
An introduction to mathematical methods useful in the computational analysis of problems in applied mathematics. Topics may include numerical methods, numerical simulation, symbolic computation, and theory of computation. May be repeated for credit with consent of instructor up to six credits. Prerequisites: MATH 266 and proficiency in a programming language, or consent of instructor. Repeatable to 6 credits. On demand.

MATH 321. Applied Statistical Methods. 3 Credits.
Introductory statistics for students with a background in single-variable calculus. Topics include descriptive statistics, continuous and discrete probability density functions, sampling distributions, point and interval estimation, and tests of hypotheses. Prerequisite: MATH 166. F,S.

MATH 330. Proof, Set Theory, and Logic. 3 Credits.
Methods of proof, axioms and operations on sets, mathematical logic, relations and functions, development of the natural and real number systems, including field axioms and the completeness axiom for the real numbers. Prerequisite: MATH 166 or consent of instructor. F,S.

MATH 352. Introduction to Partial Differential Equations. 3 Credits.
Partial differential equations. Fourier series, special functions, series solutions to ordinary differential equations. Prerequisite: MATH 266. S.
MATH 377. Geometry Elementary Teachers. 1-3 Credits.  
Experimental and inductive discovery in building geometric concepts at the elementary school level. Prerequisite: For elementary education majors only. On demand.

MATH 397. Cooperative Education. 1-8 Credits.  
A practical work experience with an employer closely associated with the student's academic area. 1-8 credits repeatable to 18. Arranged by mutual agreement among student, department, and employer. A maximum of 6 cooperative education credits may be applied against requirements for a Math major. Prerequisites: 15 completed credits in math including MATH 165, MATH 166, and MATH 265, in addition to standard co-op requirements (see department for approval). Repeatable to 18 credits. S/U grading. F,S,SS.

MATH 399. Methods for Secondary Teachers: Mathematical Content Knowledge. 3 Credits.  

MATH 400. Methods for Teaching Middle and Secondary Mathematics; Pedagogical Content Knowledge. 3 Credits.  

MATH 405. Selected Topics in Mathematics. 1-3 Credits.  
May be repeated to maximum of six credits. Prerequisite: Permission of the Mathematics Department. Repeatable to 6 credits. On demand.

MATH 408. Combinatorics. 3 Credits.  
Introduction to the techniques and reasoning needed in combinatorial problem-solving. The course may include topics related to combinatorics, such as graph theory. Prerequisites: MATH 166 and MATH 208. S, odd years.

MATH 409. Geometry. 3 Credits.  
Metric and synthetic approach to Euclidean geometry. The usual topics in elementary geometry treated in a mathematically logical way. Topics include congruence, inequalities, parallelism, similarity, area, solid geometry and the circle. Prerequisite: MATH 208 or MATH 330. F.

MATH 412. Differential Equations. 3 Credits.  
Basic types of ordinary differential equations. Existence and uniqueness of solutions. Prerequisite: MATH 266. S, even years.

MATH 415. Topics in Applied Mathematics. 1-3 Credits.  
An introduction to selected areas in applied mathematics chosen from a variety of topics including: Applied algebra, difference equations, linear programming, modeling and simulation, operations research, optimization, partial differential equations and computers in mathematics. Topics to be considered will be illustrated with examples and practical applications. May be repeated for credit with consent of instructor up to a maximum of six credits. Prerequisites: MATH 265 and consent of instructor. Repeatable to 6 credits. On demand.

MATH 416. Topics in Statistics. 1-3 Credits.  
An introduction to a variety of topics in statistics including: Linear models in categorical analysis, Bayesian methods, decision theory, ridge regression, Non parametric techniques, stochastic games and models. The number of topics to be considered during a semester will be limited to permit greater depth of coverage and sufficient practical illustrations. May be repeated for credit with consent of instructor up to six credits. Prerequisites: MATH 265 and MATH 321 or consent of instructor. Repeatable to 6 credits. On demand.

MATH 421. Statistical Theory I. 3 Credits.  
Discrete and continuous random variables, expectation, moments, moment generating functions, properties of special distributions, introduction to hypothesis testing, sampling distributions, Central Limit Theorem, curve of regression, correlation, empirical regression by least squares, maximum likelihood estimation, Neyman-Pearson lemma, likelihood ratio test, power function, chi-square tests, change of variable, "t" and "F" tests, one and two-way ANOVA, nonparametric methods. Prerequisite: MATH 265. F.

MATH 422. Statistical Theory II. 3 Credits.  
Discrete and continuous random variables, expectation, moments, moment generating functions, properties of special distributions, introduction to hypothesis testing, sampling distributions, Central Limit Theorem, curve of regression, correlation, empirical regression by least squares, maximum likelihood estimation, Neyman-Pearson lemma, likelihood ratio test, power function, chi-square tests, change of variable, "t" and "F" tests, one and two-way ANOVA, nonparametric methods. Prerequisite: MATH 421. S.

MATH 425. Cryptological Mathematics. 3 Credits.  
This course develops the math behind elementary symmetric-key ciphers and a variety of public-key schemes. Modern block ciphers may be discussed. Prerequisite: MATH 208. F, odd years.

MATH 431. Introduction to Analysis I. 3 Credits.  
Development of the real number system, functions, sequences, limits, continuity, and differentiation. Prerequisite: MATH 330 or consent of instructor. F.

MATH 432. Introduction to Analysis II. 3 Credits.  
A continuation of MATH 431. Topics in the second semester include integration, partial differentiation, infinite series, power series and vector analysis. Prerequisite: MATH 431. S.

MATH 435. Theory of Numbers. 3 Credits.  
Basic properties of numbers, including divisibility, primes, congruences, Diophantine equations and residue theory. Prerequisite: MATH 208 or MATH 300. S.

MATH 441. Abstract Algebra. 3 Credits.  
Rings, integral domains, fields, elements of group theory. Prerequisite: MATH 330 or consent of instructor. F.

MATH 442. Linear Algebra. 3 Credits.  
A theoretical treatment of systems of linear equations, matrices, vector spaces, linear transformations and elementary canonical forms. Prerequisites: MATH 207 and MATH 330 or consent of instructor. S.

MATH 460. Mathematical Modeling. 3 Credits.  
The primary goal of the course is to present the mathematical analysis provided in scientific modeling. Topics may include population modeling, mechanical vibrations, traffic flow, epidemic modeling, queues and decay processes. Prerequisites: MATH 266 and MATH 207 or consent of instructor. On demand.

MATH 461. Numerical Analysis. 3 Credits.  
Numerical techniques for: the solution of equations in one or several unknowns, approximate integration, differential equations, approximation theory, optimization theory and matrix analysis. Corresponding error analysis will be investigated. Prerequisites: MATH 266 and a scientific programming language. On demand.

MATH 471. Introduction to Complex Variables. 3 Credits.  
The complex plane, analytic functions, complex integration, power series, the theory of residues and contour integration, conformal mapping, Fourier and Laplace transformations, and applications. Prerequisite: MATH 265. F, even years.

MATH 477. Topics in Elementary School Mathematics. 1-3 Credits.  
Selected topics from mathematical concepts appropriate to the elementary school curriculum. May be repeated for credit up to six credits. Prerequisite: Elementary education majors only. Repeatable to 6 credits. On demand.

MATH 479. Topics in Mathematics Education. 1-3 Credits.  
Selected topics from mathematical concepts appropriate for K-12 educators. May be repeated for up to six credits. Prerequisite: Instructor consent. Repeatable to 6 credits. On demand.

MATH 488. Senior Capstone. 3 Credits.  
This course is designed to help students transition into working mathematicians. Thus the course will address 1) written and oral expression of mathematical material and concepts, 2) research and problem solving in mathematics, and 3) technology in mathematics, and its appropriate use. Material will build on the core areas of calculus, linear algebra, and differential equations. Prerequisites: Senior standing with a major in mathematics. F.

MATH 494. Reading Course in Mathematics. 1-3 Credits.  
Directed individual reading on selected topics not developed in other courses. Repeatable to six credits. Prerequisites: Consent of instructor. Repeatable to 6 credits. F,S,SS.

MATH 495. Readings in Mathematics. 1-3 Credits.  
Directed individual reading on selected topics not developed in other courses. Repeatable to six credits. Prerequisite: Consent of instructor. Repeatable to 6 credits. F,S,SS.
Bachelor of Science with Major in Mathematics

All students are urged to take courses in disciplines which make use of mathematics such as Physics, Chemistry, Engineering, Computer Science and Biology. Students considering graduate school are strongly urged to take MATH 441 Abstract Algebra, and MATH 432 Introduction to Analysis II.

Required 120 credits (36 of which must be numbered 300 or above, and 30 of which must be from UND) including:

I. Essential Studies Requirements (see University ES listing).

II. Non-Mathematics Requirements:

Computer Science course as approved by the Mathematics Department.

III. The Following Curriculum of 38 Major Hours:

A. Mathematics Core

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<td>MATH 266</td>
<td>Elementary Differential Equations</td>
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<td>MATH 330</td>
<td>Proof, Set Theory, and Logic</td>
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B. Breadth Requirement

One course from each of the following areas (9)

1. Theoretical Mathematics: Courses where the emphasis is on development of theory from basic principles:

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<tbody>
<tr>
<td>MATH 405</td>
<td>Selected Topics in Mathematics</td>
<td>1-3</td>
</tr>
<tr>
<td></td>
<td>(pre-approval of topic required)</td>
<td></td>
</tr>
<tr>
<td>MATH 409</td>
<td>Geometry</td>
<td>3</td>
</tr>
<tr>
<td>MATH 431</td>
<td>Introduction to Analysis I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 435</td>
<td>Theory of Numbers</td>
<td>3</td>
</tr>
<tr>
<td>MATH 441</td>
<td>Abstract Algebra</td>
<td>3</td>
</tr>
<tr>
<td>MATH 442</td>
<td>Linear Algebra</td>
<td>3</td>
</tr>
</tbody>
</table>

2. Applications of Mathematics: Courses where the emphasis is on applications of mathematics:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 352</td>
<td>Introduction to Partial Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>MATH 412</td>
<td>Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>MATH 415</td>
<td>Topics in Applied Mathematics</td>
<td>1-3</td>
</tr>
<tr>
<td>MATH 425</td>
<td>Cryptological Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 460</td>
<td>Mathematical Modeling</td>
<td>3</td>
</tr>
</tbody>
</table>

C. Depth Requirement

Courses used to satisfy C may also be used to satisfy a portion of B.

Select one of the following: 6

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 352</td>
<td>Introduction to Partial Differential Equations</td>
</tr>
<tr>
<td>&amp; MATH 412</td>
<td>and Differential Equations</td>
</tr>
<tr>
<td>MATH 408</td>
<td>Combinatorics</td>
</tr>
<tr>
<td>&amp; MATH 425</td>
<td>and Cryptological Mathematics</td>
</tr>
<tr>
<td>MATH 421</td>
<td>Statistical Theory I</td>
</tr>
<tr>
<td>&amp; MATH 422</td>
<td>and Statistical Theory II</td>
</tr>
<tr>
<td>MATH 431</td>
<td>Introduction to Analysis I</td>
</tr>
<tr>
<td>&amp; MATH 432</td>
<td>and Introduction to Analysis II</td>
</tr>
<tr>
<td>MATH 435</td>
<td>Theory of Numbers</td>
</tr>
<tr>
<td>&amp; MATH 441</td>
<td>and Abstract Algebra</td>
</tr>
<tr>
<td>MATH 441</td>
<td>Abstract Algebra</td>
</tr>
<tr>
<td>&amp; MATH 442</td>
<td>and Linear Algebra</td>
</tr>
</tbody>
</table>

D. Electives

Math courses numbered 208 and above, excluding MATH 277 Mathematics for Elementary School Teachers, MATH 399 Methods for Secondary Teachers: Mathematical Content Knowledge, MATH 377 Geometry Elementary TeachersMATH 400 Methods for Teaching Middle and Secondary Mathematics; Pedagogical Content Knowledge, MATH 477 Topics in Elementary School Mathematics (3-9 to bring the total number of credits to 38)

Teacher Licensure

Through a partnership with the College of Education and Human Development and the Department of Teaching and Learning, students may seek secondary licensure in Mathematics. The following program of study must be completed:

I. Mathematics program of study

1. The Essential Studies, Non-Mathematics, and Mathematics Core requirements as described above.

2. The following courses to satisfy the breadth requirement:

   a. Theoretical Mathematics: MATH 409 Geometry


   c. Teaching Content Requirements: MATH 208 Discrete Mathematics, MATH 308 History of Mathematics

3. The following sequence:

   MATH 435 Theory of Numbers & MATH 441 Abstract Algebra

II. Admission to the Secondary Program, normally while taking T&L 250 Introduction to Education. (See College of Education and Human Development (https://education.und.edu) for admission and licensing requirements.)

III. The program in Secondary Education (see Teaching & Learning (p. 206)):

Mathematics majors seeking secondary licensure must have an advisor in both the Mathematics Department and the Department of Teaching and Learning.

Minor in Mathematics

Required 20 credits as follows:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 165</td>
<td>Calculus I</td>
<td>8</td>
</tr>
<tr>
<td>&amp; MATH 166</td>
<td>and Calculus II</td>
<td></td>
</tr>
<tr>
<td>Math electives numbered 207 or higher *</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td></td>
<td><strong>20</strong></td>
</tr>
</tbody>
</table>
Minor in Statistics (Plan B)

Required 20 credits of Mathematics, including:

- MATH 146: Applied Calculus I
- MATH 165: Calculus I
- MATH 166: Calculus II
- MATH 208: Discrete Mathematics

Select at least one of the following: 3-4 credits

- MATH 146: Applied Calculus I
- MATH 165: Calculus I
- MATH 166: Calculus II
- MATH 208: Discrete Mathematics

All electives may be selected from Mathematics courses above Math 093.

Minor in Statistics

Minor in Statistics (Plan A)

Prerequisites
- MATH 165: Calculus I
- MATH 166: Calculus II
- MATH 265: Calculus III

Required courses
- MATH 421: Statistical Theory I
- MATH 422: Statistical Theory II

Select one of the following: 3 credits

- BIOL 470: Biometry
- EFR 513: Large Dataset Management and Analysis
- EFR 514: Discourse Analysis
- EFR 516: Statistics II
- CHE 515: Design of Engineering Experiments
- SOC 326: Sociological Statistics
- ECON 410: Empirical Methods in Economics I
- EE 411: Communications Engineering
- MATH 403: Theory of Probability
- MATH 415: Topics in Applied Mathematics
- MATH 416: Topics in Statistics
- MATH 421: Statistical Theory I
- MATH 422: Statistical Theory II
- PSYC 542: Multivariate Statistics for Psychology
- PSYC 543: Experimental Design
- SOC 521: Advanced Statistical Methods

Total Credits 21

Minor in Statistics (Plan B)

Prerequisites
- MATH 146: Applied Calculus I

Required courses
- BIOL 470: Biometry
- EFR 513: Large Dataset Management and Analysis
- EFR 514: Discourse Analysis

Total Credits 21

Mechanical Engineering (ME)

B.S. in Mechanical Engineering (p. 158)

Courses

ME 101. Introduction to Mechanical Engineering. 3 Credits.
This course encourages the development of visualization, technical communication, documentation, and fabrication skills including 3-D geometric modeling as applied to CADD applications using current methods and techniques commonly found in industry. Students will receive an introduction to engineering design and the analysis of a machine or system, including team problem solving. Approximately two-thirds of the course is classroom-based instruction and one third is laboratory (computer lab and/or shop) instruction and experimentation. Prerequisites: Mechanical Engineering major. F.

ME 102. Professional Assessment and Evaluation. 1 Credit.
This course is designed for students with industrial experience. Students complete a portfolio documenting educational and work experiences for evaluation, and individualized curriculum plans are developed. Various cademic programs in engineering are also introduced. Based on the assessment and evaluation, some engineering requirements may be waived. S/U grading only. Prerequisites: Work experience and/or technician school training plus completion of CHEM 121, CHEM 121L, PHYS 251, PHYS 252, MATH 165, MATH 166, and MATH 265. S/U grading. F,S,SS.

ME 201. Student Design. 2 Credits.
Team problem solving with design and build of a machine or mechanism, typically ASME Design Contest project. Machine shop safety and introduction to fabrication processes. Special topic lectures on contemporary Mechanical Engineering issues and research activities. Prerequisite: ME 101 or ENGR 101. Corequisites: PHYS 251 or ENGR 201. F.

ME 290. Laboratory Problems. 1-3 Credits.
Laboratory investigations of interest to student and faculty. Repeatable to a maximum of 6 credits. Prerequisite: Consent of instructor. Repeatable to 6 credits. On demand.

ME 301. Materials Science. 3 Credits.
The theory of the structure of matter, the prediction and evaluation of engineering properties of materials. Prerequisites: CHEM 121 with a grade of C or better. PHYS 252 with a grade of C or better, and admission to the mechanical engineering program. F.

ME 306. Fluid Mechanics. 3 Credits.
Fluid properties; fluid statics and dynamics; transport theory and transport analogies, conservation of mass, energy, and momentum; dimensional analysis; boundary layer concepts; pipe flows; compressible flow; open channel flow. Prerequisites: PHYS 251 and MATH 265, both with a grade of C or better. F,S.
ME 313. Material Properties and Selection. 3 Credits.
Study of relationships between materials, manufacture and design of engineering component. Prerequisite: ME 301 and admission to the professional Mechanical Engineering program. On demand.

ME 322. Design of Machinery. 3 Credits.
Analytical study of motions, velocities, accelerations and forces for design of machine elements. Introduction to spatial mechanisms, robotics, and actuator selection. Prerequisites: ENGR 200 with a grade of C or better, ENGR 201 with a grade of C or better, and admission to the professional Mechanical engineering program. F.S.

ME 323. Machine Component Design. 3 Credits.
Design of machine elements such as shafts, bearings, gears, clutches, springs, threaded components, and bolted, riveted, welded, and bonded joints. Stress and failure theory analyses of the implementation of machine components are covered. Prerequisites: ENGR 203 with a grade of C or better, and admission to the professional Mechanical Engineering program. Corequisite: ME 323L. S.

ME 323L. Machine Component Design Laboratory. 1 Credit.
Application of design and analysis tools developed in the Machine Component Design course. Laboratory emphasizes creative design, analysis techniques, construction methods, and design report writing. Prerequisite: Admission to the professional Mechanical Engineering program. Corequisite: ME 323. S.

ME 341. Thermodynamics. 3 Credits.
Fundamental energy relationships applied to both closed and open systems. Determination of thermodynamic properties, first and second laws of thermodynamic processes and basic cycles. Prerequisites: PHYS 251 and MATH 166, both with a grade of C or better. F.S.

ME 342. Intermediate Thermodynamics. 3 Credits.
Power and refrigeration cycles. Exergy analysis, psychrometrics, reacting and non-reacting mixtures. Prerequisite: ME 341 with a grade of C or better and admission to the professional Mechanical Engineering program. On demand.

ME 370. Engineering Disasters and Ethics. 3 Credits.
Engineering disasters will be the basis for teaching an ethics course to engineering students. Starting with the premise that most people know the difference between right and wrong (this is not a course on criminal activity!), the course explores how engineers, in spite of their best intentions, sometimes create disastrous situations. The effect of cumulative adverse detail is difficult to teach except with case studies. Also explored is cost vs. safety trade-offs, the role of lawsuits, and government regulation. Prerequisites: Junior or Senior standing. F.

ME 388. Undergraduate Research in Mechanical Engineering. 3 Credits.
Students will conduct a supervised independent study in a research lab or as part of a design team culminating in a research report. Prerequisite: Approval from department chair and faculty sponsor. S.

ME 397. Cooperative Education. 1-2 Credits.
A practical work experience with an employer closely associated with the student's academic area. Arranged by mutual agreement among student, department and employer. Repeatable to 12 credits. Prerequisite: Admission to the professional Mechanical Engineering program. Repeatable to 12 credits. S/ U grading. F.S.SS.

ME 418. Manufacturing Processes. 3 Credits.
Descriptive and analytical study of manufacturing methods and economics as they pertain to machining, metrology and automation. Prerequisites: ENGR 203 with a grade of C or better, ME 301, and admission to the professional Mechanical Engineering program. S.

ME 418L. Manufacturing Processes Laboratory. 1 Credit.
Application of manufacturing methods in the Manufacturing Processes course including casting, machining, welding/soldering/brazing, forming (metals and plastics), heat treatment, metrology and automation. Prerequisite or Corequisite: ME 418. S.SS.

ME 420. Composite Materials. 3 Credits.
Prerequisites: ME 301 and admission to the professional Mechanical Engineering program. On demand.

ME 424. Systems Dynamics and Control. 3 Credits.
Theory, analysis, and design of linear closed-loop control systems containing electronic, hydraulic, and mechanical components. Differential equations. LaPlace transforms, Nyquist and Bode diagrams are covered. Prerequisites: MATH 266, ME 322, and admission to the professional Mechanical Engineering program. On demand.

ME 425. Numerical Methods for Engineers Using Advanced MATLAB Programming Techniques. 3 Credits.
In this course, numerical methods for solving differential equations, advanced Matlab programming techniques and their applications to practical engineering problems will be presented. Topics covered include Matlab programming, solving systems of equations, linear algebra, function and data manipulation, and differential equations. For students who enroll for graduate credit, they will apply class concepts to solve an engineering problem related to their research problems as a course project. Prerequisites: ENGR 202, MATH 266, and admission to PDP. S.

ME 426. Mechanical Vibrations. 3 Credits.
Vibration analysis and design as it applies to single and multi degree freedom mechanical systems, isolation and absorption of vibration, vibration of continuous systems, numerical methods of solution. Prerequisites: ENGR 202 with a grade of C or better, MATH 266, and admission to the professional Mechanical Engineering program. S.

ME 428. Advanced Manufacturing Processes. 3 Credits.
Individual projects involving the manufacturing economics and flow charts for selected products and basic technical principles of manufacturing processes. Includes laboratory. Prerequisites: ME 418 and admission to the professional Mechanical Engineering program. On demand.

ME 429. Introduction to Finite Element Analysis. 3 Credits.
Finite element analysis is introduced as a design tool. Emphasis is given to modeling techniques and element types. Matrix methods are used throughout the class. Prerequisites: ENGR 203 with a grade of C and admission to the professional Mechanical Engineering program. On demand.

ME 439. Introduction to Robotics. 3 Credits.
A systems engineering approach to robotics. Presents an introduction to manipulators, sensors, actuators, and end effectors for automation. Topics covered include kinematics, dynamics, control, programming of manipulators, pattern recognition, and computer vision. Prerequisites: ENGR 202 with a grade of C or better, MATH 166 with a grade of C or better, and admission to the professional Mechanical Engineering program. On demand.

ME 446. Gas Turbines. 3 Credits.
General principles, thermodynamics, and performance of gas turbine engines. Design consideration of engine components. Prerequisites: ME 341 with a grade of C or better and admission to the professional Mechanical Engineering program. On demand.

ME 449. Internal Combustion Engines. 3 Credits.
Fundamentals of spark ignition and compression ignition engines, related components and processes. Prerequisites: ME 342 and admission to the professional Mechanical Engineering program or consent of instructor. Corequisite: ME 474. On demand.

ME 451. Heating and Air Conditioning. 3 Credits.
Psychrometrics, heating and cooling loads and analysis of air conditioning systems. Prerequisites: ME 342 and admission to the professional Mechanical Engineering program or consent of instructor. Corequisite: ME 474. On demand.

ME 454. Computational Fluid Dynamics. 3 Credits.
Provides a practical experience using computational fluid dynamics and provides supporting material in fluid dynamics, which is useful in understanding the need to resolve grids in boundary layers and other regions of high velocity gradients. The course is structured as half lecture and half laboratory. The lecture covers topics related to laminar and turbulence boundary layers with and without acceleration, turbulence modeling, wakes and jets. The laboratory provides experience in building grids using the program GAMBIT, the solid/fluid modeling and meshing program, and calculating solutions using FLUENT, a commercial flow solver. Prerequisites: ME 306, MATH 266, and admission to the professional Mechanical Engineering program. On demand.

ME 466. Aerodynamics. 3 Credits.
ME 466 Aerodynamics is an introductory course on the fundamentals of aerodynamics for engineers. The class will cover a review of fluid mechanics including boundary layers and compressible flow. The course topics include parameters for airfoil and wings, incompressible flow over airfoils and wings of infinite and finite span, compressible and transonic flow over wings and aircraft, supersonic flow over thin airfoils, and supersonic flow over wings and airplane configurations. The course will follow a standard text "Aerodynamics for Engineers," 6th Edition by Bertin and Cummings. The course will qualify as either a thermal fluid science elective or an aerospace concentration elective. Prerequisites: ME 306 and ME 341. S, odd years.
ME 474. Fundamentals of Heat and Mass Transfer. 3 Credits.
Convection, conduction, radiation, dimensional analysis and design of heat transfer equipment. Prerequisites: MATH 266, ME 306, ME 341 with a grade of C or better, and admission to the professional Mechanical Engineering program. S.

ME 476. Intermediate Fluid Mechanics. 3 Credits.

ME 477. Compressible Fluid Flow. 3 Credits.
Introduction to the theory and application of one-dimensional compressible flow. Course topics include incompressible flow in converging and diverging nozzles, normal shock waves, oblique shock waves, Prandtl-Meyer flow, flow with friction and heat addition. Prerequisite: Admission to the professional Mechanical Engineering program. Prerequisites or Corequisites: ME 341 with a grade of C or better and ME 306. On demand.

ME 480. Mechanical Engineering Seminar. 3 Credits.
Reports and presentations on current developments in mechanical engineering and engineering ethics. Prerequisites: Senior Standing and admission to the professional Mechanical Engineering program. F.

ME 483. Mechanical Measurements Laboratory. 3 Credits.
Experiments and written reports on the operation and performance of instruments and basic mechanical engineering equipment. Prerequisites: ENGR 206 and admission to the professional Mechanical Engineering program. F.

ME 484. Ground Vehicle Dynamics. 3 Credits.
ME 484 is a junior and senior level elective course. This course deals with the design of ground vehicle suspension and steering systems. Vehicle ride, handling and safety systems are covered along with passive and active suspension control. Prerequisite: ME 322 and admission to the professional Mechanical Engineering program or consent of instructor. On demand.

ME 485. Multiphysics Modeling. 3 Credits.
Theory and techniques of modeling coupled thermal, fluid, mechanical, and/or electrical fields in components design. The focus is on the fundamental techniques used to simultaneously derive and solve coupled equations and the use of commercial multi physics finite element software. Prerequisite: ME 323. S.

ME 487. Engineering Design. 2 Credits.
The first course of a two-semester sequence in Engineering Design, students will establish important features of the machine or system to be designed, perform market analysis, establish design objectives, explore alternatives, conduct research, specify constraints. Prerequisites: ME 322, ME 323, ME 323L, ME 474 or any one elective from the thermal science group, and admission to the professional Mechanical Engineering program. Corequisite: ME 483. Prerequisite or Corequisite: ENGR 460. F.

ME 488. Engineering Design. 3 Credits.
Systematic study and practice essential to the optimal design of a complete machine or system, utilizing economic and social constraints together with current mechanical and thermal design techniques. The course is a continuation of ME 487 taken the preceding semester. Prerequisites: ME 487 and admission to the professional Mechanical Engineering program. S.

ME 489. Senior Honors Thesis. 1-8 Credits.
Supervised independent study culminating in a thesis. Repeatable to 9 credits. Prerequisites: Consent of the Department, approval of the Honors Committee, and admission to the professional Mechanical Engineering program. Repeatable to 9 credits. F.S.

ME 490. Special Laboratory Problems. 1-3 Credits.
Laboratory investigations of interest to students and faculty. Repeatable to maximum of 6 credits. Prerequisites: Consent of instructor and admission to the professional Mechanical Engineering program. Repeatable to 6 credits. On demand.

Bachelor of Science in Mechanical Engineering

Required 129 credits (36 of which must be numbered 300 or above, and 60 of which must be from a 4-year institution) including:

I. Essential Studies Requirements (see University ES listing).
II. The Following Curriculum:

Freshman Year
First Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 121</td>
<td>General Chemistry I 1</td>
</tr>
<tr>
<td>CHEM 121L</td>
<td>General Chemistry I Laboratory 1</td>
</tr>
<tr>
<td>ENGL 110</td>
<td>College Composition I 1</td>
</tr>
<tr>
<td>ME 101</td>
<td>Introduction to Mechanical Engineering 1,2</td>
</tr>
<tr>
<td>MATH 165</td>
<td>Calculus I 1</td>
</tr>
<tr>
<td>Arts and Humanities</td>
<td></td>
</tr>
</tbody>
</table>

Credits: 17

Second Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGR 200</td>
<td>Computer Applications in Engineering 1,2</td>
</tr>
<tr>
<td>ENGL 130</td>
<td>Composition II: Writing for Public Audiences</td>
</tr>
<tr>
<td>MATH 166</td>
<td>Calculus II 1</td>
</tr>
<tr>
<td>PHYS 251</td>
<td>University Physics I 1</td>
</tr>
<tr>
<td>Arts and Humanities</td>
<td></td>
</tr>
</tbody>
</table>

Credits: 16

Sophomore Year
First Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGR 201</td>
<td>Statics 1</td>
</tr>
<tr>
<td>ME 201</td>
<td>Student Design 2</td>
</tr>
<tr>
<td>ME 341</td>
<td>Thermodynamics 1</td>
</tr>
<tr>
<td>MATH 265</td>
<td>Calculus III 1</td>
</tr>
<tr>
<td>PHYS 252</td>
<td>University Physics II 1</td>
</tr>
</tbody>
</table>

Credits: 16

Second Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGR 202</td>
<td>Dynamics 3</td>
</tr>
<tr>
<td>ENGR 203</td>
<td>Mechanics of Materials 1</td>
</tr>
<tr>
<td>ENGR 206</td>
<td>Fundamentals of Electrical Engineering</td>
</tr>
<tr>
<td>MATH 266</td>
<td>Elementary Differential Equations</td>
</tr>
<tr>
<td>PHYS 253 or CHEM 122L</td>
<td>University Physics III 3 or General Chemistry II</td>
</tr>
</tbody>
</table>

Credits: 16

Junior Year
First Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 301</td>
<td>Materials Science</td>
</tr>
<tr>
<td>ME 306</td>
<td>Fluid Mechanics</td>
</tr>
<tr>
<td>ME 322</td>
<td>Design of Machinery</td>
</tr>
<tr>
<td>ENGR 460</td>
<td>Engineering Economy</td>
</tr>
<tr>
<td>Technical Elective 4</td>
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</tbody>
</table>

Credits: 15

Second Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 323</td>
<td>Machine Component Design</td>
</tr>
<tr>
<td>ME 323L</td>
<td>Machine Component Design Laboratory</td>
</tr>
<tr>
<td>ME 418</td>
<td>Manufacturing Processes</td>
</tr>
<tr>
<td>ME 474</td>
<td>Fundamentals of Heat and Mass Transfer</td>
</tr>
<tr>
<td>MATH 321</td>
<td>Applied Statistical Methods 5</td>
</tr>
<tr>
<td>Technical Elective 4</td>
<td></td>
</tr>
</tbody>
</table>

Credits: 17

Senior Year
First Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 480</td>
<td>Mechanical Engineering Seminar</td>
</tr>
<tr>
<td>ME 483</td>
<td>Mechanical Measurements Laboratory</td>
</tr>
<tr>
<td>ME 487</td>
<td>Engineering Design</td>
</tr>
<tr>
<td>Social Science</td>
<td></td>
</tr>
<tr>
<td>Technical Elective 4</td>
<td></td>
</tr>
</tbody>
</table>

Credits: 17

Second Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 488</td>
<td>Engineering Design</td>
</tr>
</tbody>
</table>
### Technical Electives and Optional Concentrations

One technical elective must be taken from each stem unless the student is pursuing the Aerospace Concentration (see below). Students may receive an optional concentration, documented on the transcript, in one of the listed stems as indicated. Students who satisfactorily complete two full-time (40 hours/wk) or three part-time (20 hours+/wk) ME 397 Cooperative Education experiences for a combined total of at least three credit hours are granted a waiver for one technical elective, provided one of the Cooperative Education experiences lasts for the duration of either a fall or spring semester. The waived technical elective is considered as elective at large and is not specified into any one of the three stems listed below.

#### I. Mechanical Design Stem

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 424</td>
<td>Systems Dynamics and Control (#)</td>
<td>3</td>
</tr>
<tr>
<td>ME 426</td>
<td>Mechanical Vibrations (#)</td>
<td>3</td>
</tr>
<tr>
<td>ME 429</td>
<td>Introduction to Finite Element Analysis (#)</td>
<td>3</td>
</tr>
<tr>
<td>ME 439</td>
<td>Introduction to Robotics</td>
<td>3</td>
</tr>
<tr>
<td>ME 484</td>
<td>Ground Vehicle Dynamics</td>
<td>3</td>
</tr>
<tr>
<td>ME 485</td>
<td>Multiphysics Modeling</td>
<td>3</td>
</tr>
<tr>
<td>ME 523</td>
<td>Advanced Machine Design (#)</td>
<td>3</td>
</tr>
<tr>
<td>ME 525</td>
<td>Metal Fatigue in Engineering (#)</td>
<td>3</td>
</tr>
<tr>
<td>ME 526</td>
<td>Advanced Vibrations (#)</td>
<td>3</td>
</tr>
<tr>
<td>ME 529</td>
<td>Advanced Finite Element Methods (#)</td>
<td>3</td>
</tr>
<tr>
<td>ME 532</td>
<td>Advanced Dynamics (#)</td>
<td>3</td>
</tr>
</tbody>
</table>

**Mechanical Design Concentration - 129 hours**

Requires ME 323 Machine Component Design/ME 323L Machine Component Design Laboratory and any four of the Mechanical Design Stem technical electives.

#### II. Thermal Sciences Stem

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 342</td>
<td>Intermediate Thermodynamics (#)</td>
<td>3</td>
</tr>
<tr>
<td>ME 446</td>
<td>Gas Turbines (#)</td>
<td>3</td>
</tr>
<tr>
<td>ME 449</td>
<td>Internal Combustion Engines (#)</td>
<td>3</td>
</tr>
<tr>
<td>ME 451</td>
<td>Heating and Air Conditioning</td>
<td>3</td>
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<tr>
<td>ME 464</td>
<td>Computational Fluid Dynamics (#)</td>
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<td>ME 476</td>
<td>Intermediate Fluid Mechanics (#)</td>
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<tr>
<td>ME 477</td>
<td>Compressible Fluid Flow (#)</td>
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<tr>
<td>ME 485</td>
<td>Multiphysics Modeling</td>
<td>3</td>
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<tr>
<td>ME 542</td>
<td>Thermodynamics of Materials</td>
<td>3</td>
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<tr>
<td>ME 545</td>
<td>Fluidized-Bed Combustion Engineering</td>
<td>3</td>
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<tr>
<td>ME 574</td>
<td>Advanced Heat Transfer (#)</td>
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<tr>
<td>ME 575</td>
<td>Conduction and Radiation Heat Transfer (#)</td>
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<tr>
<td>ME 576</td>
<td>Convective Heat Transfer (#)</td>
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</table>

**Thermal Sciences Concentration - 129 hours**

Requires ME 306 Fluid Mechanics, ME 341 Thermodynamics and any four of the Thermal Sciences Stem technical electives.

#### III. Manufacturing and Materials Stem

<table>
<thead>
<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>ME 313</td>
<td>Material Properties and Selection</td>
<td>3</td>
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<tr>
<td>ME 420</td>
<td>Composite Materials (#)</td>
<td>3</td>
</tr>
<tr>
<td>ME 428</td>
<td>Advanced Manufacturing Processes</td>
<td>3</td>
</tr>
</tbody>
</table>

#### IV. Aerospace Concentration - 134 hours

Requires students to complete AVIT 102 Introduction to Aviation (5 credits) plus six technical electives. AVIT 102 Introduction to Aviation includes earning a private pilot license and is recommended for the summer session between the freshman and sophomore years.

Technical electives must be chosen from the aerospace group of electives as identified by # in the above technical elective listing. One of the technical electives must be either ME 429 Introduction to Finite Element Analysis or ME 464 Computational Fluid Dynamics. ME 490 Special Laboratory Problems or an ME 590 Special Topics may also be included in the aerospace group at the discretion of the Mechanical Engineering Chair.

1. Students must achieve a grade of “C” or better.
2. ME 101 Introduction to Mechanical Engineering, ME 201 Student Design, ENGR 200 Computer Applications in Engineering and ME 397 Cooperative Education may be waived by successful completion of ME 102 Professional Assessment and Evaluation. The ethics requirement as represented by ME 370 Engineering Disasters and Ethics/ CHE 340 or PHIL 250 Ethics in Engineering and Science may also be waived, but not the University’s Essential Studies Requirements.
3. Another lab science may be substituted for PHYS 253 University Physics III or CHEM 122 General Chemistry II, consistent with the student’s individual learning plan, by petition to the ME Department.
4. One technical elective can be taken outside the ME Department within other CEM Departments, Math or Physics. The course must be at the 300-level or higher and be consistent with the student’s individual learning plan.
5. An alternative calculus-based statistics course may be substituted for MATH 321 with approval of the ME Department.
6. Students already holding a private pilot license may provide proof of this certification to the ME Department as a substitute for AVIT 102 Introduction to Aviation.

### Medical Laboratory Science (MLS)

B.S. in Medical Laboratory Science (p. 161)

Certificate in Medical Laboratory Science (4+1 Track) (p. 162)

#### Courses

- **MLS 101. Orientation to Medical Laboratory Sciences. 2 Credits.**
  - Introduction to the role, ethics, conduct, certification, education, employment, and fundamental knowledge and skills related to medical laboratory science. F.

- **MLS 234. Human Parasitology. 2 Credits.**
  - Physiological aspects of human parasites, their symbiotic host parasite relationships and clinical diagnostic techniques. Prerequisites: MLS, Clinical Chemistry/Urinalysis, Hematology/Hemostasis, Immunohematology or Microbiology program students only. F,S,S,S.

- **MLS 234L. Human Parasitology Laboratory. 1 Credit.**
  - Laboratory methods for the identification and diagnosis of human parasites. Prerequisites: MLS, Categorical Certificate Clinical Chemistry/Urinalysis, Categorical Certificate Hematology/Hemostasis, Categorical Certificate Immunohematology or Categorical Certificate Microbiology students only. F.

- **MLS 301. Immunology. 3 Credits.**
  - Principles of clinical immunology focusing on the cellular and molecular nature of antigens and immunoglobulin, the immune response, immunogenetics, and immune mediated disease. Prerequisites: MLS, Clinical Chemistry/Urinalysis, Hematology/Hemostasis, Immunohematology or Microbiology program students only. F.
MLS 325. Hematology. 3 Credits.
Identification of normal and abnormal blood cells in various hematological disorders. Theory and application of hematology procedures. Theory and mechanisms of hemostasis. Prerequisites: MLS, Clinical Chemistry/Urinalysis, Hematology/Hemostasis, Immunohematology or Microbiology program students only. F.

MLS 325L. Hematology Laboratory. 2 Credits.
Morphologic examination of blood and bone marrow and laboratory testing used in hematological study. F,S,SS.

MLS 336. Laboratory Calculations. 1 Credit.
Calculations used in the clinical laboratory including measurement systems, dilutions, graphing, solution chemistry, statistics of quality control and research interpretation. Prerequisites: MLS, Clinical Chemistry/Urinalysis, Hematology/Hemostasis, Immunohematology or Microbiology program students only. F.

MLS 340. Molecular Diagnostics. 2 Credits.
An introduction to specific molecular biology application in the laboratory and a discussion of cell biology, DNA chemistry, genetics, nucleic acid extraction and modification, blotting, polymerase chain reactions, and probes in relation to diagnostic investigations. Prerequisites: MLS program students only. S.

MLS 340L. Molecular Diagnostics Laboratory. 1 Credit.
Application of molecular techniques including the operation of molecular based instrumentation, DNA extraction and measurement, blotting, polymerase chain reactions, and utilization of probes. Prerequisites: MLS program students only. S.

MLS 380. Professional Issues in Clinical Laboratory Science. 1 Credit.
Discussion of CSL professional issues, ethics, current topics of healthcare delivery, governmental regulations, societal concerns, cultural diversity, disease prevention, research and environment. Prerequisites: MLS Program Students Only. SS.

MLS 394. Medical Microbiology. 2 Credits.
Medically important microorganisms are identified using a wide variety of clinical techniques. Included in the discussion will be susceptibility studies and the correlation of the presence of microorganisms to health and disease. Prerequisites: MLS, Categorical Certificate Clinical Chemistry/Urinalysis, Categorical Certificate Hematology/Hemostasis, Categorical Certificate Immunohematology or Categorical Certificate Microbiology students only. S.

MLS 399. Special Topics in Clinical Laboratory Science. 1-13 Credits.
Lecture, discussion, and readings on topics of current interest in the clinical laboratory sciences. Prerequisites: MLS Program Students Only. Repeatable to 13 credits. F,S,SS.

MLS 430. Clinical Practicum I. 12 Credits.
Applied theory and practice at the clinical affiliate. S/U grading. F.

MLS 440. Clinical Practicum II. 12 Credits.
Techniques and practice in the clinical affiliate. S/U grading. S.

MLS 460. Laboratory Practice. 2 Credits.
This course represents an overview of standard laboratory practices including safety, glassware, microscopes, centrifuges, balances, specimen collection and handling. Prerequisites: MLS, Clinical Chemistry/Urinalysis, Hematology/Hemostasis, Immunohematology or Microbiology program students only. F,S,SS.

MLS 464. Clinical Review. 3 Credits.
Emphasis is on concepts related to the role of a clinical laboratory scientist. Analysis and evaluation focuses on the theories of immunohematology, clinical chemistry, microbiology, hematology and other areas contributing to clinical application. F.

MLS 465. Clinical Laboratory Management. 3 Credits.
Management practices in the clinical laboratory including concepts related to service and quality, information management, financial management, personnel management, laboratory education and research. Prerequisites: MLS, Clinical Chemistry/Urinalysis, Hematology/Hemostasis, Immunohematology or Microbiology program students only. F,S,SS.

MLS 471. Clinical Chemistry I. 2 Credits.
Theories and principles of clinical chemistry procedures are discussed as well as how the results of these procedures correlate to health and disease. Prerequisites: MLS, Clinical Chemistry/Urinalysis, Hematology/Hemostasis, Immunohematology or Microbiology program students only. SS.

MLS 472. Pre-analytical Skills. 1 Credit.
Theory and practice of phlebotomy in the clinical setting, specimen processing, review of state and federal regulations, safety and biohazard compliance, interpersonal relationship skills. Prerequisites: MLS Program Students Only. SS.

MLS 473. Clinical Hemostasis I. 2 Credits.
Physiologic mechanisms of normal human hemostasis as well as hereditary and acquired defects. Laboratory techniques performed and discussed are screening tests and specific assays for abnormalities, procedures to monitor therapeutic measures and practice and maintenance of current instrumentation. Prerequisites: MLS, Clinical Chemistry/Urinalysis, Hematology/Hemostasis, Immunohematology or Microbiology program students only. SS.

MLS 474. Clinical Urinalysis I. 2 Credits.
Theory, techniques and practice of microscopy and urinalysis with emphasis on identification of elements in the sediment. Prerequisites: MLS, Clinical Chemistry/Urinalysis, Hematology/Hemostasis, Immunohematology or Microbiology program students only. SS.

MLS 477. Clinical Immunohematology I. 1 Credit.
Theory of modern transfusion techniques, component therapy, and quality assurance. Prerequisites: MLS, Clinical Chemistry/Urinalysis, Hematology, Hemostasis, Immunohematology or Microbiology program students only. SS.

MLS 477L. Clinical Immunohematology I Lab. 1 Credit.
Practical application of modern transfusion techniques, component therapy, and quality assurance. Prerequisites: MLS, Clinical Chemistry/Urinalysis, Hematology/Hemostasis, Immunohematology or Microbiology program students only. SS.

MLS 478. Clinical Microbiology I. 2 Credits.
Groups of medically important bacteria are studied and correlated to laboratory practice in identification. Included in the discussions are antibiotic susceptibility testing, quality control, and methods of identification including rapid, automated, and traditional methods. Prerequisites: MLS, Clinical Chemistry/Urinalysis, Hematology/Hemostasis, Immunohematology or Microbiology program students only.

MLS 479. Clinical Hematology I. 2 Credits.
Emphasis on interpretive correlation of hematology findings and pathophysiology. Topics of current interest and advances in hematology. Prerequisites: MLS, Clinical Chemistry/Urinalysis, Hematology/Hemostasis, Immunohematology or Microbiology program students only. SS.

MLS 480. Clinical Immunohematology II. 2 Credits.
Applied theory and modern transfusion at the clinical affiliate. Offered annually. Prerequisites: MLS, Clinical Chemistry/Urinalysis, Hematology/Hemostasis, Immunohematology or Microbiology program students only.

MLS 481. Clinical Chemistry II. 2 Credits.
Applied theory and practice in clinical chemistry at the clinical affiliate. Prerequisites: MLS, Clinical Chemistry/Urinalysis, Hematology/Hemostasis, Immunohematology or Microbiology program students only. F.

MLS 483. Clinical Hemostasis II. 1 Credit.
Techniques and practice in routine phlebotomy and hemostasis at the clinical affiliate. Prerequisites: MLS, Clinical Chemistry/Urinalysis, Hematology/Hemostasis, Immunohematology or Microbiology program students only. F.

MLS 484. Clinical Microbiology II. 2 Credits.
Applied theory and practice in clinical microbiology at the clinical affiliate. Prerequisites: MLS, Clinical Chemistry/Urinalysis, Hematology/Hemostasis, Immunohematology or Microbiology program students only.

MLS 485. Clinical Urinalysis II. 1 Credit.
Applied theory and practice in urinalysis and observation, practice, or research in specialized areas or settings at the clinical affiliate. Prerequisites: MLS, Clinical Chemistry/Urinalysis, Hematology/Hemostasis, Immunohematology or Microbiology program students only. F.

MLS 487. Medical Mycology. 1 Credit.
Comparative morphology, physiology and pathogenicity of medically important fungi. Laboratory methods for identification emphasize interpretation and evaluation of results including the recognition of contaminating organisms. Prerequisites: MLS, Clinical Chemistry/Urinalysis, Hematology/Hemostasis, Immunohematology or Microbiology program students only. F.

MLS 488. Clinical Hematology II. 2 Credits.
Applied theory and practice in clinical hematology at the clinical affiliate. Prerequisites: MLS, Clinical Chemistry/Urinalysis, Hematology/Hemostasis, Immunohematology or Microbiology program students only. F.
MLS 489. Clinical Body Fluids. 1 Credit.
Overview of the theory and practice in manual procedures of human body fluids. The body fluids to be discussed include: spinal, synovial and amniotic fluid, transudates and exudates, fecal specimens, gastric, sweat, and other body fluid secretions. Prerequisites: MLS, Clinical Chemistry/Urinalysis, Hematology/Hemostasis, Immunohematology or Microbiology program students only. S.

MLS 490. Financial and Quality Management of the Clinical Laboratory. 3 Credits.
A capstone course designed to provide senior students with the skills to manage a clinical laboratory. The course brings together previous content with a focus on laboratory profitability, quality management, and quality improvement. Offered annually. Prerequisites: Enrollment in clinical practicum coursework is the corequisite; MLS program students only. F.

MLS 491. Clinical Chemistry III. 2 Credits.
Techniques and practice in clinical chemistry at the clinical affiliate. Prerequisites: MLS, Clinical Chemistry/Urinalysis, Hematology/Hemostasis, Immunohematology or Microbiology program students only. S.

MLS 492. Clinical Immunohematology III. 2 Credits.
Techniques and modern transfusion practices at the clinical affiliate. Prerequisites: MLS, Clinical Chemistry/Urinalysis, Hematology/Hemostasis, Immunohematology or Microbiology program students only. S.

MLS 493. Clinical Immunohematology Lab. 2 Credits.
Pre-analytical Skills
Prerequisites: MLS, Clinical Chemistry/Urinalysis, Hematology/Hemostasis, Immunohematology or Microbiology program students only. S.

MLS 494. Clinical Immunology. 1 Credit.
Applied theory and practice in clinical immunology and serology at the clinical affiliate. Prerequisites: MLS, Categorical Certificate Clinical Chemistry/Urinalysis, Categorical Certificate Hematology/Hemostasis, Categorical Certificate Immunohematology or Categorical Certificate Microbiology program students only. S.

MLS 495. Clinical Microbiology III. 2 Credits.
Techniques and practice in clinical microbiology at the clinical affiliate. Prerequisites: MLS, Clinical Chemistry/Urinalysis, Hematology/Hemostasis, Immunohematology or Microbiology program students only. S.

MLS 496. Clinical Hematology III. 2 Credits.
Techniques and practice in clinical hematology at the clinical affiliate. Prerequisites: MLS, Clinical Chemistry/Urinalysis, Hematology/Hemostasis, Immunohematology or Microbiology program students only. S.

Bachelor of Science in Medical Laboratory Science

The Medical Laboratory Science (MLS) courses are listed.

Required: 126 credits (36 of which must be numbered 300 or above, and 60 credits of which must be from a four-year institution) including:

I. Essential Studies Requirements (see University ES listing).

II. MLS Curriculum Requirements:

Freshman Year
First Semester
ENGL 110 College Composition I 3
BIOL 150 General Biology I 4
& 150L and General Biology I Laboratory 1
CHEM 121 General Chemistry I 4
& 121L and General Chemistry I Laboratory 1
MATH 103 College Algebra 3
Credits 14
Second Semester
COMM 110 Fundamentals of Public Speaking 3
CHEM 122 General Chemistry II 4
& 122L and General Chemistry II Laboratory 1
ENGL 130 Composition II: Writing for Public Audiences 3
BIOL 151 General Biology II 3
Arts & Humanities Elective (Global Diversity Category) 3
Credits 16

Sophomore Year
First Semester
ANAT 204 Anatomy for Paramedical Personnel 3
MLS 101 Orientation to Medical Laboratory Sciences 2
COMM 212 Interpersonal Communication 3
MBIO 202 Introductory Medical Microbiology Lecture 3
Soc Sci Elective (Introduction to Psychology Recommended) 3
Credits 14
Second Semester
CHEM 340 Survey of Organic Chemistry 5
& 340L and Survey of Organic Chemistry Laboratory 1
MLS 234 Human Parasitology 2
MLS 234L Human Parasitology Laboratory 1
PPT 301 Human Physiology 4
Soc Sci Elective (US Diversity Category) 3
Credits 15

Junior Year
First Semester
Professional Curriculum Year 1
MLS 301 Immunology 3
MLS 325 Hematology 3
MLS 325L Hematology Laboratory 2
MLS 336 Laboratory Calculations 1
Soc Sci Elect (Introduction to Sociology Recommended) 3
Arts & Humanities Elective (Fine Arts Category) 3
Credits 15
Second Semester
MLS 340 Molecular Diagnostics 2
MLS 340L Molecular Diagnostics Laboratory 1
MLS 380 Professional Issues in Clinical Laboratory Science 1
MLS 394 Medical Microbiology 2
BMB 301 Biochemistry 3
MGMT 300 Principles of Management 3
Arts & Humanities (Humanities Category) 3
Credits 15

Senior Year
First Semester
Professional Curriculum Year 2
Credits 0
Summer
MLS 471 Clinical Chemistry I 2
MLS 472 Pre-analytical Skills 1
MLS 473 Clinical Hemostasis I 2
MLS 474 Clinical Urinalysis I 2
MLS 477 Clinical Immunohematology I 1
MLS 477L Clinical Immunohematology I Lab 1
MLS 478 Clinical Microbiology I 2
MLS 479 Clinical Hematology I 2
Credits 13
Fall
MLS 480 Clinical Immunohematology II 2
MLS 481 Clinical Chemistry II 2
MLS 483 Clinical Hemostasis II 1
MLS 484 Clinical Microbiology II 2
MLS 485 Clinical Urinalysis II 1
MLS 487 Medical Mycology 1
MLS 488 Clinical Hematology II 2
MLS 489 Clinical Body Fluids 1
Credits 12
Spring
MLS 490 Financial and Quality Management of the Clinical Laboratory 3
Credits 0

University of North Dakota 161
Certificate in Medical Laboratory Science Program (4+1 Track)

Students enrolled in the certificate program (4+1 track) have earned a baccalaureate degree from a regionally accredited college or university. Prior to entering the final clinical year of the professional program, the student must complete specific prerequisite courses. The final clinical year is the same as the traditional (2+2 track) and the Western College Alliance (3+1 track) student experience. The 4+1 student earns a certificate in Medical Laboratory Science from the University of North Dakota upon successful completion of all courses and is eligible to complete the national certification exam. If a student wishes to earn a second baccalaureate degree in Medical Laboratory Science from the University of North Dakota, the student must also have completed coursework to meet the Essential Studies requirements.

Prerequisite Courses Credits

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<tr>
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<tr>
<td>General Chemistry</td>
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<td>Organic Chemistry</td>
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<td>General Biology</td>
<td>6</td>
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<tr>
<td>Microbiology</td>
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<tr>
<td>Anatomy</td>
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<tr>
<td>Physiology</td>
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<td>MLS 234 Human Parasitology</td>
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<tr>
<td>MLS 301 Immunology</td>
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</tr>
<tr>
<td>MLS 325 Hematology</td>
<td>3</td>
</tr>
<tr>
<td>MLS 325L Hematology Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>MLS 336 Laboratory Calculations (Recommended)</td>
<td>1</td>
</tr>
<tr>
<td>MLS 340 Molecular Diagnostics</td>
<td>2</td>
</tr>
<tr>
<td>MLS 394 Medical Microbiology (Recommended)</td>
<td>2</td>
</tr>
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<td>Total Credits</td>
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</table>

* Available online from the MLS Program
** Offered as an intensive laboratory on campus in May

When a student is registered in 300 and 400 level MLS courses a specific MLS tuition is assessed.

Upon successful completion of the prerequisite coursework, the 4+1 student applies to the second year of the professional program (see BS MLS Professional Curriculum Year 2 previously listed). The applicant must have a cumulative GPA of 2.8, and no more than one D in any math or science course. Exceptions for acceptance and continuance may be made by petitioning the Department of Medical Laboratory Science Professional and Academic Standards Committee.

Upon successful completion of the 4+1 program of study, the student will earn a certificate in MLS from UND and will be eligible to complete the national certification examination and become a certified Medical Laboratory Scientist.

When a student is registered in 300 and 400 level MLS courses, a specific MLS tuition is assessed.

Categorical Certificate Training Program

The Medical Laboratory Science Categorical Certificate Training Program from the University of North Dakota provides advanced skills to baccalaureate prepared students, enabling them to work in high complexity clinical laboratories. The program includes four individual certificate categories: Clinical Chemistry/Urinalysis; Hematology/Hemostasis; Immunohematology; and Microbiology.

Upon successful completion of one categorical category, the student is eligible to complete the ASCP (American Society of Clinical Pathology) national certification exam in the specific categorical area. If the student completes all four categorical categories, the student is eligible to complete the ASCP national certification medical laboratory science (MLS) exam.

**Admission Requirements**

To be admitted to the UND MLS Categorical Program(s), the student must meet the following requirements:

- Hold a baccalaureate degree from a regionally accredited college or university
- Have a minimum of 20 semester credit hours in the biological, chemical and/or medical sciences (these credits can be part of, or in addition to the B.S. degree)
- Have the support of an accredited medical laboratory to facilitate the student’s clinical experience

**Clinical Chemistry/Urinalysis**

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<td>MLS 340 Molecular Diagnostics</td>
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<tr>
<td>MLS 460 Laboratory Practice</td>
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<tr>
<td>MLS 465 Clinical Laboratory Management</td>
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<tr>
<td>MLS 471 Clinical Chemistry I</td>
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<td>MLS 474 Clinical Urinalysis I</td>
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<td>MLS 481 Clinical Chemistry II</td>
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<tr>
<td>MLS 485 Clinical Urinalysis II</td>
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<tr>
<td>MLS 489 Clinical Body Fluids</td>
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<tr>
<td>MLS 491 Clinical Chemistry III</td>
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**Hematology/Hemostasis**

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<tr>
<td>MLS 325 Hematology</td>
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<td>MLS 325L Hematology Laboratory</td>
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<td>MLS 336 Laboratory Calculations</td>
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<td>MLS 460 Laboratory Practice</td>
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<tr>
<td>MLS 465 Clinical Laboratory Management</td>
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<tr>
<td>MLS 473 Clinical Hemostasis I</td>
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<tr>
<td>MLS 479 Clinical Hemostasis I</td>
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<td>MLS 498 Clinical Hemostasis III</td>
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**Immunohematology**

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<td>MLS 460 Laboratory Practice</td>
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<td>MLS 473 Clinical Hemostasis I</td>
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<tr>
<td>MLS 477 Clinical Immunohematology I</td>
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<tr>
<td>MLS 477L Clinical Immunohematology I Lab</td>
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<tr>
<td>MLS 480 Clinical Immunohematology II</td>
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<td>MLS 492 Clinical Immunohematology III</td>
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<td>MLS 494 Clinical Immunology</td>
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**Microbiology**

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<td>MLS 234 Human Parasitology</td>
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<td>MLS 336 Laboratory Calculations</td>
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</table>
When a student is registered in 300 and 400 level MLS courses, a specific MLS tuition is assessed.

**Medicine (Med)**

**Courses**

**MED 100. Introduction to Health Sciences Professions. 1 Credit.**
Introduction to the roles, ethics, certification, education, employment and fundamental knowledge and skills related to the health sciences professions.
F,S,SS.

**MED 205. Medical Terminology. 1 Credit.**
Knowledge of medical terminology learned through the study of different body systems.
F,S,SS.

**Microbiology and Immunology (MBio)**

**Courses**

**MBIO 202. Introductory Medical Microbiology Lecture. 3 Credits.**
An introductory medical microbiology course primarily for nursing and clinical lab science students but open to allied health students with permission of the instructor. This course provides a background in all aspects of microbial agents and disease. Three hours lecture per week. Prerequisite: CHEM 116 or CHEM 121 with a grade of C or higher.
F.

**MBIO 202L. Introductory Medical Microbiology Laboratory. 2 Credits.**
An introductory laboratory course in the isolation and identification of all types of microorganisms with an emphasis on those that cause disease. Four hours laboratory per week. Prerequisite: CHEM 116 or 121 with a grade of C or higher. Corequisite: MBIO 202.
F.

**MBIO 302. General Microbiology Lecture. 2 Credits.**
An introduction to general microbiology with emphasis on the morphology, classification, and physiology of bacteria, fungi, parasites, and viruses. The significance of microorganisms in food processing, waste disposal, and in maintaining our environment is discussed. Two hours lecture per week. Prerequisites: BIOL 150 and CHEM 116 or CHEM 121, with a grade of C or better in both prerequisite courses or permission of instructor.
S.

**MBIO 302L. General Microbiology Laboratory. 2 Credits.**
The growth, isolation, and identification of microorganisms from a variety of sources using procedures such as staining, microscopy, pure culturing, and biochemical tests. Four hours laboratory per week. Prerequisite or Corequisite: MBIO 302.
F.

**MBIO 328. Introduction to Immunology. 3 Credits.**
An introduction to the fundamentals of immunology including immunoochemistry, humoral and cellular response, hypersensitivity, immunodeficiency, immunogenetics, tolerance and immunodiagnosis. Prerequisite: A grade of C or higher in BIOL 150 or BIOL 151 or BMB 301.
F.

**Military Science (MS)**

Minor in Military Science (p. 164)

**Courses**

**MS 101. Military Science I. 2 Credits.**
This beginner class introduces you to the personal challenges and competencies that are critical for effective leadership and communication. You will learn how the personal development of life skills such as cultural understanding, goal setting, time management, stress management, and comprehensive fitness relate to leadership, officer-ship, and the Army profession. Participation in a weekend exercise is optional.
F.

**MS 101L. Leadership Lab I. 1 Credit.**
An introduction to individual and team aspects of military team building and leadership in small unit operations. Includes basic drill and ceremony, marksmanship training and fundamental concepts of leadership. Corequisite: MS 101.
F.

**MS 102. Military Science II. 2 Credits.**
Introduces you to the professional challenges and competencies that are needed for effective execution of the profession of arms and Army communication. Through this course, you will learn how Army ethics and values shape your army and the specific ways that these ethics are inculcated into Army culture. Prerequisite: MS 101.
S.

**MS 102L. Leadership Lab I. 1 Credit.**
An introduction to individual and team aspects of military team building and leadership in small unit operations. Includes operation order writing, team level movement techniques and continue concepts of leadership. Corequisite: MS 102.
S.

**MS 141. Army Conditioning I. 1 Credit.**
This course is designed for beginners, emphasizing on the Army components of physical fitness; cardiorespiratory endurance, muscular strength, muscular endurance, flexibility and body composition. A key objective is for each student to achieve a minimum score of 180 points total, in three events of the Army Personal Fitness Test (APFT): push-ups, sit-ups and a two mile run. Corequisites: MS 101 MS 101L.
F.

**MS 142. Army Conditioning II. 1 Credit.**
This course is designed for intermediate level instruction, emphasizing on the Army components of physical fitness; cardiorespiratory endurance, muscular strength, muscular endurance, flexibility and body composition. A key objective is for each student to achieve a minimum score of 180 points total, in three events of the Army Personal Fitness Test (APFT): push-ups, sit-ups and a two mile run.
S.

**MS 143. Army Conditioning III. 1 Credit.**
This course is designed for advanced level instruction, emphasizing on the Army components of physical fitness; cardiorespiratory endurance, muscular strength, muscular endurance, flexibility and body composition. A key objective is for each student to achieve a minimum score of 270 points total, in three events of the Army Personal Fitness Test (APFT): push-ups, sit-ups and a two mile run.
F,S.

**MS 201. Military Science II. 2 Credits.**
This class primarily is drawn from the Adaptability Army Learning Area (ALA). The outcomes are demonstrated through Critical and Creative Thinking and the ability to apply Trophy Leading Procedures (TLP). Comprehension of the officer's role in Leading Change by applying Innovative Solutions to Problems in concert with the Principles of Mission Command. The Army Profession is also stressed through leadership forum and a leadership self-assessment. Corequisites: MS 101 and MS 102.
F.

**MS 201L. Leadership Lab II. 1 Credit.**
Learn and apply the principles of effective leadership. Reinforce self confidence. Includes drill and ceremony, weapon qualification and leadership principles. Corequisites: MS 201 and MS 241.
F.

**MS 202. Military Science II. 2 Credits.**
This class begins the journey to understand and demonstrate Cross-Cultural Competencies as they relate to Army doctrine and how they apply in a combatant commander's Engagement Strategies. Army Values, Teamwork, and Warrior Ethos and their relationship to the Law of Land Warfare and philosophy of military service are also stressed. The ability to lead and follow is also covered through Team Building exercises in small units up to squad level. Corequisites: MS 101, MS 102, and MS 201.
F.

**MS 202L. Leadership Lab II. 1 Credit.**
Learn and apply the principles of effective leadership. Reinforce self confidence. Includes small unit tactics, land navigation and fire (Field Leadership Reaction Course). Corequisites: MS 202 and MS 242.
S.
MS 215. Conflict Simulation. 1 Credit.
A course analyzing military strategy and tactics through the use of war gaming activities based upon historical renderings. F.S.

MS 341. Military Physical Conditioning II. 1 Credit.
Building on concepts of the 100 level class, emphasizing on the Army components of physical fitness; cardiorespiratory endurance, muscular strength, muscular endurance, flexibility and body composition. A key objective is for each student to achieve a minimum score of 230 points total, in the three events of the Army Personal Fitness Test (APFT): pushups, sit-ups, and a timed two-mile run. Corequisites: MS 201 and MS 201L. F.

MS 242. Military Physical Conditioning II. 1 Credit.
Continuation of 201 with emphasis on leadership of a squad during physical training, supervising each individual’s correct performance of stretching and calisthenics, as well as following assigned students progression and taking responsibility for mentoring subordinates. A key objective is for each student to achieve a minimum score of 230 points total, in the three events of the Army Personal Fitness Test (APFT): pushups, situps, and a timed two-mile run. Corequisites: MS 202 and MS 202L. S.

MS 290. ROTC Basic Course. 4 Credits.
This course allows those students to receive credit for completing Basic Training and AIT; A DD214 is required or completion of CIET (Cadet Initial Entry Training). Both options can also be used to enter the advanced course Army ROTC. It also can be used by military veterans to receive credit for completion of basic training and advanced occupational skill training; A DD214 is required with RE code listed (Member 4 copy). F,S,SS.

MS 301. Military Science III. 3 Credits.
Series of practical opportunities in leadership and problem solving used to lead small groups, receive personal assessments and encouragement, and lead again in situations of increasing complexity. Uses small unit tactics and opportunities to plan and conduct training for lower division students both to develop such skills and as vehicles for practicing leadership skills. Plan and execute a leadership lab class for the ROTC Battalion. Participation in one weekend exercise is also required, and one or two more weekend exercises may be offered for optional participation. Prerequisites: MS 101, MS 102, MS 201, MS 202 or Basic Combat Training or (CIET) Cadet Initial Entry Training. Corequisites: MS 301L and MS 341. F.

MS 301L. Leadership Lab III. 1 Credit.
Series of practical opportunities to lead small groups, receive personal assessments, and encourage leadership. Plan and execute a leadership lab class for the ROTC Battalion. Participation in one weekend exercise is required; two other weekend exercises may be offered for optional participation. Prerequisites: MS 101, MS 102, MS 201, MS 202, and MS 202L. Corequisites: MS 301L and MS 341. S.

MS 302. Military Science III. 3 Credits.
Continues methodology of MSci 301. Analyze tasks; prepare written or oral guidance for team members to accomplish tasks. Delegated tasks and supervise. Plan for and adapt to the unexpected in organizations under stress. Examine and apply lessons from leadership case studies. Examine importance of ethical decision making in setting a positive climate that enhances team performance. Plan and execute a leadership lab class for the ROTC Battalion. Participation in one weekend exercise is required; two other weekend exercises may be offered for optional participation. Prerequisites: MS 101, MS 102, MS 201, MS 202, and MS 202L. Corequisites: MS 302L, and MS 342. S.

MS 302L. Leadership Lab III. 1 Credit.
Series of practical opportunities to lead small groups, receive personal assessments, and encourage leadership. Plan and execute a leadership lab class for the ROTC Battalion. Participation in one weekend exercise is required; two other weekend exercises may be offered for optional participation. Prerequisites: MS 101, MS 102, MS 201, MS 202, and MS 202L. Corequisites: MS 302L, and MS 342. S.

MS 341. Military Physical Conditioning III. 1 Credit.
Instruction is on leadership of a company sized element and the phases of fitness conditioning, preparatory conditioning, and maintenance. A key objective is for each student to achieve a minimum score of 260 points total, in the three events of the Army Personal Fitness Test (APFT): pushups, sit-ups, and a timed two-mile run. Corequisites: MS 302 and MS 302L. S.

MS 342. Military Physical Conditioning III. 1 Credit.
Continuation of 341 with instruction on leadership of a company sized element and the phases of fitness conditioning, preparatory conditioning, and maintenance. A key objective is for each student to achieve a minimum score of 260 points total, in the three events of the Army Personal Fitness Test (APFT): pushups, sit-ups, and a timed two-mile run. Corequisites: MS 302 and MS 302L. S.

MS 401. Military Science IV. 3 Credits.
The focus of this semester is leadership development, critical thinking, and the final preparation for commissioning as an Army Lieutenant. There is an instructional mixture of leadership, professional competence, adaptability, teamwork, lifelong learning, comprehensive fitness, and the Army as a profession. Course includes leadership laboratories and field exercises to further leader development and preparation as a future Army leader. Prerequisites: MS 101, MS 102, MS 201, MS 202, MS 301 and MS 302L. Corequisites: MS 401L and MS 441. F.

MS 401L. Leadership Lab IV. 1 Credit.
A culmination of all the concepts learned in the previous classes with emphasis on writing operation orders for company level and higher. Responsible for all Army ROTC Cadet Battalion training involving a series of practical exercises and evaluation of training. Corequisites: MS 401 and MS 441. F.

MS 402. Military Science IV. 3 Credits.
This course is the culmination of a well-rounded four year educational experience. It is during this semester that the Cadet is undergoing final preparation for commissioning and integration into the Army. The emphasis is placed on skills that the newly commissioned officer will need to succeed in their first unit of assignment, demonstrating the ability to plan, prepare, execute, and assess platoon-level training strategies to enable mission accomplishment. Course includes leadership laboratories and field exercises. Prerequisites: MS 101, MS 102, MS 201, MS 202, MS 301, MS 302, and MS 401. Corequisites: MS 402L and MS 442. S.

MS 402L. Leadership Lab IV. 1 Credit.
A culmination of all of the concepts learned in the previous classes with emphasis on writing operation orders for company level and higher. Responsible for all Army ROTC Cadet Battalion training involving a series of practical exercises and evaluation of training. Corequisites: MS 402 and MS 442. S.

MS 441. Military Physical Conditioning IV. 1 Credit.
Putting together all of the personal fitness concepts learned in the previous classes with emphasis on leadership of a battalion sized organization, including planning and coordination of all physical fitness for the ROTC Battalion and evaluation of the personal fitness training and trainers. Coordination of individual training specific to fitness ends. An essential objective for each student is to achieve a minimum score of 270 points total, in the three events of the Army Physical Fitness Test (APFT): pushups, sit-ups, and a timed two-mile run. Corequisites: MS 401 and MS 401L. F.

MS 442. Military Physical Conditioning IV. 1 Credit.
Continuation of 441 with emphasis on grasping the Army’s policy on physical fitness, fitness maintenance, and safety. Become familiar with Army regulations and forms pertaining to physical fitness. Responsible for documentation, testing and briefing of the ROTC Battalion’s Physical Fitness Program. An essential objective for each student is to achieve a minimum score of 270 points total, in the three events of the Army Physical Fitness Test (APFT): timed pushups, sit-ups, and a two-mile run. Corequisites: MS 402 and MS 402L. S.

MS 499. Special Topics. 1-3 Credits.
Special Topics for the Department of Military Science. Repeatable to 6 credits. Repeatable to 6 credits. F.S.
Music Theory and Composition

MUSC 130. Music Theory I. 3 Credits.
The study of diatonic harmonic and melodic principles of Western European music from 1600 to 1900. Topics include harmonic progressions, melodic patterns, rhythmic patterns, and voice leading. Material is learned through part writing, keyboard skills, and music analysis. Corequisite: MUSC 131. F.

MUSC 131. Aural Skills I. 1 Credit.
Training in reading at sight and in aural recognition involving dictation, keyboard, and singing skills. Corequisite: MUSC 130. F.

MUSC 132. Keyboard Skills I. 1 Credit.
Beginning classroom instruction in keyboard. Prerequisite: Open to Music majors or permission od department. F.

MUSC 134. Music Theory II. 3 Credits.
The continuation of diatonic materials from Music Theory I with an introduction to chromatic materials. Material is learned through part writing, keyboard skills, and music analysis. Prerequisite: MUSC 130 with a grade of C or better. Corequisite: MUSC 135. S.

MUSC 135. Aural Skills II. 1 Credit.
Training in reading at sight and in aural recognition involving dictation, keyboard, and singing skills. Prerequisite: MUSC 131 with a grade of C or better. Corequisite: MUSC 134. F.

MUSC 136. Keyboard Skills II. 1 Credit.
Intermediate classroom instruction in keyboard. Prerequisite: MUSC 133 with a grade of C or better. S.

MUSC 230. Music Theory III. 3 Credits.
The continued study of chromatic materials covered in MUSC 134. Material is learned through part writing, keyboard skills, and music analysis. Prerequisites: MUSC 133 and MUSC 134, with a grade of C or better. Corequisite: MUSC 231. F.

MUSC 231. Aural Skills III. 1 Credit.
Continuation of the development of sight reading and aural recognition skills including music dictation. Prerequisites: MUSC 135 with a grade of C or better. Corequisite: MUSC 230. F.

MUSC 233. Keyboard Skills III. 1 Credit.
Continuation of the development of fundamental piano skills with emphasis on the improvement of keyboard technique and repertoire. Prerequisites: MUSC 136 with a grade of C or better. F.

MUSC 234. Music Theory IV: Music Theory since 1900. 3 Credits.
Music thought, techniques, and theories of the 20th century and beyond. Material is learned through musical analysis and orginal compositions. Prerequisite: MUSC 230 or MUSC 232 with a grade of C or better. Corequisite: MUSC 235. S.

MUSC 235. Aural Skills IV. 1 Credit.
Continuation of the development of sight reading and aural recognition skills including music dictation. Prerequisite: MUSC 231 with a grade of C or better. Corequisite: MUSC 234. S.

MUSC 236. Keyboard Skills IV. 1 Credit.
Continuation of the development of fundamental piano skills with emphasis on the improvement of keyboard technique and repertoire. Prerequisite: MUSC 233 with a grade of C or better. S.

MUSC 423. Instrumental and Choral Arranging. 2 Credits.
Scoring techniques for instrumental and vocal ensembles, including band, orchestra, jazz ensemble, choir and children's chorus. Specific areas of focus to be determined by abilities and interests of the students. Prerequisite: MUSC 134. F, odd years.

MUSC 424. Electronic Music. 3 Credits.
Electronic music composition and sound synthesis using digital synthesizers and processors, recording equipment, and computers. Study of technological developments, important recordings, styles, composers, and trends. On demand.

MUSC 427. Analysis of Musical Form. 2 Credits.
Analysis of the principal forms of musical composition. Prerequisite: MUSC 230 or MUSC 232 with a grade of C or better. F, even years.

MUSC 428. Counterpoint. 2 Credits.
Analysis and construction of basic counterpoint. Prerequisite: MUSC 230. F, even years.

MUSC 429. Composition. 2 Credits.
Original composition in smaller forms for vocal and instrumental solos and ensembles. Prerequisite: MUSC 234 or instructor permission. F.

MUSC 430. Composition Lessons. 1 Credit.
Individual or small group instruction in music composition. Repeatable. Prerequisite: MUSC 429 or instructor permission. Repeatable. F.S.
Music History and Literature

MUSC 200. Music in America. 3 Credits.
A historical survey of music in America from pre-colonial times through the twentieth century, including Classical, Ethnic, Folk, and Popular Traditions. Designed for non-majors; will include listening techniques and writing about music. On demand.

MUSC 201. Rock and Roll History I: From World War II to 1975. 3 Credits.
This class will give students a survey of the major styles, periods, and influence-streams that make up the extremely large and varied category of “Rock” music produced between World War II and 1975. The course covers many styles, but the focus is on English-language mainstream popular music.

MUSC 203. Music and Culture. 3 Credits.
Exploration of how human culture is expressed through music.

MUSC 276. Collegium Musicum. 1-4 Credits.
Study and performance of vocal and instrumental music of the Medieval, Renaissance, and Baroque eras, and other selected compositions which are rarely performed. Repeatable to 8 credits. On demand.

MUSC 310. Music History Survey I. 3Credits.
A historical survey of western art music from Ancient Times to 1650. Prerequisite: MUSC 134 or instructors permission.

MUSC 311. Music History Survey II. 3 Credits.
A historical survey of western art music from 1650 to the present. Prerequisites: MUSC 133 and MUSC 134 or permission of instructor.

MUSC 410. Piano Literature. 3 Credits.
Study and analysis of keyboard music from the Baroque period to the present, with attention to the development of forms, techniques, and styles. Prerequisite: Piano, MUSC 354 or MUSC 355, or consent of instructor.

MUSC 415. Vocal Literature. 3 Credits.
An historical overview of the development of art song and opera incorporating reading, listening, score study and analysis. Prerequisites: MUSC 254 and MUSC 255.

MUSC 416. Choral Literature. 2-4 Credits.
Choral literature from the Renaissance to the present with particular attention given to the representative compositions in both large and small forms. Prerequisites: Three hours of Music History and Literature.

MUSC 417. Instrumental Literature. 2 Credits.
Wind instrument literature from the Renaissance to the present with particular attention given to the representative compositions in both large and small forms.

Music Therapy

MUSC 180. Introduction to Music Therapy. 3 Credits.
An overview of the field of music therapy, an introduction to its history and principles, different therapy models and techniques, and common populations served by the discipline. This course is open to all students interested in learning more about the field.

MUSC 280. Music Therapy Clinical Skills. 3 Credits.
An introduction to basic counseling skills and group leadership skills, study of the specific therapeutic uses of music, of the components of the treatment plan, and ethical considerations in the field. Prerequisites: MUSC 180 and the successful completion of the Sophomore Review as described in the Academic Catalog; department consent required.

MUSC 281. Music Therapy Techniques I. 2 Credits.
Basic therapeutic instrument mastery of guitar, autoharp, percussion and Orff instruments, tuning and maintenance, repertoire learning, developing basic vocal and percussion improvisation and songwriting skills, designing therapeutic interventions. Prerequisites: MUSC 180 and the successful completion of the Sophomore Review as described in the Academic Catalog; department consent required.

MUSC 282. Music Therapy Practicum I. 1 Credit.
Supervised field experience co-facilitating sessions for special populations in the community. In addition to clinical work, students attend an on-campus seminar. Prerequisites: Statewide (MN ND) nationwide background checks with acceptable results within 1 year prior to the beginning of class, MUSC 180 the successful completion of the Sophomore Review as described in the Academic Catalog; dept consent req.

MUSC 380. Music Therapy Theories and Methods II (Adults). 3 Credits.
In-depth demonstration, analysis and comparison of specific music therapy models, a study of the theories, methods and techniques associated with these models, with special emphasis on the treatment of adults. Prerequisite: MUSC 280.

MUSC 381. Music Therapy Techniques II. 2 Credits.
Students will work on developing musical skills and techniques for the design and implementation of music therapy activities in a variety of clinical settings. Prerequisite: MUSC 281.

MUSC 382. Music Therapy Practicum II. 1 Credit.
Supervised field experience co-facilitating sessions for special populations in the community. In addition to clinical work, students attend an on-campus seminar. Prerequisites: Statewide (MN and ND) and nationwide background checks with acceptable results within one year prior to the beginning of class, and MUSC 282.

MUSC 383. Music Therapy Practicum III. 1 Credit.
Supervised field experience co-facilitating sessions for special populations in the community. In addition to clinical work, students attend an on-campus seminar. Prerequisites: Statewide (MN and ND) and nationwide background checks with acceptable results within one year prior to the beginning of class, and MUSC 382.

MUSC 397. Cooperative Education in Music. 1-2 Credits.
This course is intended for students seeking cooperative placements in the field of music. All placements will be conducted under the supervision of an appropriate music professional. Arranged by mutual agreement between student, department and placement supervisor. Repeatable to 4 credits.

MUSC 414. Piano Literature. 3 Credits.
A historical survey of western art music from 1650 to the present, with attention to the development of forms, techniques, and styles. Prerequisite: Piano, MUSC 354 or MUSC 355, or consent of instructor.

MUSC 415. Vocal Literature. 3 Credits.
An historical overview of the development of art song and opera incorporating reading, listening, score study and analysis. Prerequisites: MUSC 254 and MUSC 255.

MUSC 416. Choral Literature. 2-4 Credits.
Choral literature from the Renaissance to the present with particular attention given to the representative compositions in both large and small forms.

MUSC 417. Instrumental Literature. 2 Credits.
Wind instrument literature from the Renaissance to the present with particular attention given to the representative compositions in both large and small forms.

MUSC 380. Music Therapy Theories and Methods II (Adults). 3 Credits.
In-depth demonstration, analysis and comparison of specific music therapy models, a study of the theories, methods and techniques associated with these models, with special emphasis on the treatment of adults. Prerequisite: MUSC 280.

MUSC 381. Music Therapy Techniques II. 2 Credits.
Students will work on developing musical skills and techniques for the design and implementation of music therapy activities in a variety of clinical settings. Prerequisite: MUSC 281.

MUSC 382. Music Therapy Practicum II. 1 Credit.
Supervised field experience co-facilitating sessions for special populations in the community. In addition to clinical work, students attend an on-campus seminar. Prerequisites: Statewide (MN and ND) and nationwide background checks with acceptable results within one year prior to the beginning of class, and MUSC 282.

MUSC 383. Music Therapy Practicum III. 1 Credit.
Supervised field experience co-facilitating sessions for special populations in the community. In addition to clinical work, students attend an on-campus seminar. Prerequisites: Statewide (MN and ND) and nationwide background checks with acceptable results within one year prior to the beginning of class, and MUSC 382.

MUSC 497. Internship in Music. 1-8 Credits.
This course is intended for students seeking internships in the field of music. All placements will be conducted under the supervision of an appropriate music professional. Arranged by mutual agreement between student, department and placement supervisor. Repeatable to 16 credits.

MUSC 480. Psychological Foundations of Music Learning. 3 Credits.
An in-depth study of the psychological foundations of musical behavior including human response to music, music preference and ability; psychoacoustical parameters; and research in the field. Prerequisites: MUSC 383 and SOC 326.

MUSC 481. Music Therapy Practicum IV. 1 Credit.
Supervised field experience co-facilitating sessions for special populations in the community. In addition to clinical work, students attend an on-campus seminar. Prerequisites: Statewide (MN and ND) and nationwide background checks with acceptable results within one year prior to the beginning of class, and MUSC 383.

MUSC 497. Internship in Music. 1-8 Credits.
This course is intended for students seeking internships in the field of music. All placements will be conducted under the supervision of an appropriate music professional. Arranged by mutual agreement between student, department and placement supervisor. Repeatable to 16 credits. S/U grading.

Music Education

MUSC 140. Methods: Woodwinds, Brass, Strings, Percussion, Voice. 1 Credit.
Offers music education students performance and pedagogical instruction on voice and instruments in the brass, woodwind, string and percussion families. Repeatable to 6 credits. Prerequisite: Music majors and minors only. Repeatable to 6 credits.

MUSC 340. Introduction to Music Technology. 2 Credits.
Introduction to acoustics, digital music software, and audio hardware.

MUSC 440. Methods and Materials for Elementary Music. 3 Credits.
Overview of methods and materials in elementary music for music majors and minors. Includes experiences for the practical application of course content. Corequisite: T&L 386.

MUSC 441. Methods and Materials for Middle and Secondary School Music. 3 Credits.
Strategies and materials used in teaching music in middle and secondary schools with emphasis on integration and practical application of course content and continuing development of professional music teaching competencies. Prerequisites: Admission to Teaching and Learning, passed Music Sophomore Review, and 75 total credit hours. Corequisite: T&L 486.

MUSC 442. Music for Elementary School Teachers. 3 Credits.
Survey of elementary school music. Development of teacher skills and knowledge emphasizing conceptual understandings and music competencies essential in the musical growth of children. Prerequisite: Admissions to Teacher Education; not open to music majors or minors.
MUSIC 443. Music Methods and Materials for Elementary School Teachers. 3 Credits.
An overview of elementary methods and materials for non-majors with a musical background. S, odd years.

MUSIC 445. Choral Methods. 3 Credits.
The primary goal of this course is to provide the student with the skills and knowledge in the teaching, directing and managing of choral ensembles. Topics covered will include classroom management, sight-reading instruction, sequencing, the adolescent changing voice, program management, effective rehearsal techniques, professional expectations, selecting appropriate literature, and assessment. Students will be engaged in learning through weekly readings, class discussions, lectures, guest speakers, special projects, recordings, videos, quizzes, exams, and more. F, even years.

MUSIC 446. Instrumental Classroom Methods and Materials. 3 Credits. F, odd years.

MUSIC 447. Jazz Pedagogy. 2 Credits.
Organization of and materials appropriate for the jazz band, methods of teaching the rhythmic and tonal problems inherent in its style. On demand.

MUSIC 448. Orchestra Directors’ Course. 1 Credit.
Organizational and administrative problems of the orchestra director such as curriculum, recruiting, scheduling, programming, promotion of the string program, and literature. On demand.

MUSIC 449. Music Education Special Topics. 1-3 Credits. Repeatable to 3 credits. F.S.

Music Performance

a. Conducting

MUSIC 256. Basic Conducting. 2 Credits.
Development of basic conducting techniques, baton technique, and use of the left hand. Reading of choral and instrumental scores. Prerequisites: MUSC 130. F.

MUSIC 357. Choral Conducting. 2 Credits.
Conducting problems and rehearsal techniques in relation to choral literature in various styles based on score, class performance, and recordings. Prerequisites: MUSC 236 and MUSC 256. S, odd years.

MUSIC 358. Instrumental Conducting. 2 Credits.
Instrumental conducting, rehearsal techniques, and score reading through the use of instrumental literature of various styles and periods. Prerequisite: MUSC 256. S, even years.

b. Pedagogy

MUSIC 444. Applied Music Pedagogy. 2 Credits.
Readings, instruction, and application of pedagogical principles and materials relevant to the student's major instrument(s). May be repeated for credit up to 6 hours. Prerequisites: MUSC 254 or MUSC 255. Repeatable to 6 credits. F, even years.

c. Music Ensembles

MUSIC 260. Concert Choir. 1 Credit.
Select mixed choir performing the finest choral literature from every historical era. Repeatable to 12 credits. F.S.

MUSIC 261. University Chamber Choir. 1 Credit.
Select small mixed choir focusing on a different kind of choral music every semester, from early music to jazz and theater. Repeatable to 12 credits. F.S.

MUSIC 263. Varsity Bands Men’s Chorus. 1 Credit.
Men’s vocal ensemble specializing in traditional shorter choral works, folk songs, spirituals, and lighter fare. Repeatable to 12 credits. F.S.

MUSIC 264. Women’s Chorus. 1 Credit.
Women’s vocal ensemble specializing in traditional shorter choral works, folk songs, spirituals, and lighter fare. Repeatable to 12 credits. F.S.

MUSIC 266. Old English Christmas Feast. 1 Credit.
Participation in all scheduled activities for the Old English Christmas Feast, to include singing (large groups and strolling minstrels), serving meals, acting, and ushering. Repeatable to 12 credits. F.

MUSIC 269. Opera Workshop. 1 Credit.
Production and presentation of chamber operas, scenes from larger works, and major productions, fully staged and costumed. Repeatable to 12 credits. S.

MUSIC 270. Wind Ensemble. 1 Credit.
Select ensemble of wind and percussion students performing the finest concert band literature. Repeatable to 12 credits. F.S.

MUSIC 271. University Band. 1 Credit.
Concert band open to all university students without audition, performing a wide variety of contemporary band literature. Repeatable to 12 credits. F.S.

MUSIC 272. Marching/Athletic Band. 1 Credit.
The Pride of the North Band is open to all students on campus, and performs on the field and in the stands at all home games for the UND football, men’s and women’s basketball, and hockey teams. Repeatable to 12 credits. F.S.

MUSIC 273. Instrumental Jazz Ensemble. 1 Credit.
Big band jazz ensemble performing music ranging from the swing era to the sounds of today. Repeatable to 12 credits. F.S.

MUSIC 274. Symphony Orchestra. 1 Credit.
Ensemble for performance of works for large orchestra. Repeatable to 12 credits. F.S.

MUSIC 275. University Chamber Orchestra. 1 Credit.
Ensemble for chamber performance of works for small orchestra. Repeatable to 12 credits. F.S.

MUSIC 276. Collegium Musicum. 1-4 Credits.
Study and performance of vocal and instrumental music of the Medieval, Renaissance, and Baroque eras, and other selected compositions which are rarely performed. Repeatable to 8 credits. On demand.

MUSIC 277. Chamber Music Groups. 1 Credit.
Any combination of strings, brass, woodwind, voices, percussion, or keyboard instruments on an ad hoc basis by a faculty member to utilize the particular talents of advanced students in exploring and performing chamber music literature. These groups will prepare compositions in such media as string quartets and trios, woodwind quintets, and vocal quartets. Repeatable to 20 credits. F.S.

MUSIC 278. Collaborative Piano. 1 Credit.
The student will gain experience in learning accompanying techniques and literature. Repeatable without limitation. Repeatable. F.S.

d. Applied Music (Group Instruction)

MUSIC 150. Class Lessons. 1 Credit.
Beginning class instruction in any of the following instrumental classes: Brass, Woodwind, Percussion, and String Class; Piano Class; Voice Class; Guitar Class. May be repeated for credit without limitation. Repeatable. F.S.

MUSIC 151. Class Lessons. 1 Credit.
Intermediate class instruction in any of the following instrumental classes: Brass, Woodwind, Percussion, and String Class; Piano Class; Voice Class; Guitar Class. May be repeated for credit without limitation. Repeatable. F.S.

MUSIC 152. Class Guitar for Music Majors. 1 Credit.
Beginning class instruction on guitar for music majors. Prerequisite: Instructor permission. F.

MUSIC 242. Diction for Singers. 1 Credit.
Rules for and practical application of two of the major languages used in song literature: Italian/English or French/German. May be repeated for credit up to 2 hours when topics vary. Offered Fall odd years and Spring even years. Prerequisite: Two semesters of private voice lessons.

MUSIC 252. Class Guitar for Music Majors. 1 Credit.
Intermediate class instruction on guitar for music majors. Prerequisites: MUSC 152 and permission of instructor. S.

e. Applied Music (Individual Lessons*)

MUSIC 153. Individual Lessons for Non-Majors. 1 Credit.
Beginning college-level applied study of the stated instrument or voice, for non-Music majors. Half hour lesson. For the final examination, the student will perform before a faculty committee (jury). No regular student may take an Applied Music course without credit or on other than a letter grade basis. Repeatable. Does not count toward music degree credit. Prerequisite: Permission of instructor. Repeatable to 12 credits. F.S.
MUSC 154. Individual Lessons. 1 Credit.
Applied study of the stated instrument or voice at the freshman level. Half hour lesson. For the final examination, the student will perform before a faculty committee (jury). No regular student may take an Applied Music course without credit or on other than a letter grade basis. Repeatable. Prerequisite: Permission of instructor; Music Education, Music Therapy, Music Majors, and Music Minors only. Repeatable. F.S.

MUSC 155. Individual Lessons. 2 Credits.
Applied study of the stated instrument or voice at the freshman level for Bachelor of Music in Performance students and others. One-hour lesson. For the final examination, the student will perform before a faculty committee (jury). No regular student may take an Applied Music course without credit or on other than a letter grade basis. Course is repeatable. Prerequisite: Permission of the instructor. Repeatable. F.S.

MUSC 253. Individual Lessons for Non-Majors. 1 Credit.
Intermediate college-level applied study of the stated instrument or voice, for non-Music majors. Half hour lesson. For the final examination, the student will perform before a faculty committee (jury). No regular student may take an Applied Music course without credit or on other than a letter grade basis. Prerequisites: MUSC 154 and permission of instructor. Repeatable. F.S.

MUSC 254. Individual Lessons. 1 Credit.
Applied study of the stated instrument or voice at the sophomore level. Half hour lesson. For the final examination, the student will perform before a faculty committee (jury). No regular student may take an Applied Music course without credit or on other than a letter grade basis. Prerequisite: Permission of instructor. Repeatable. F.S.

MUSC 255. Individual Lessons. 2 Credits.
Applied study of the stated instrument or voice at the sophomore level for Bachelor of Music in Performance students and others. One-hour lesson. For the final examination, the student will perform before a faculty committee (jury). No regular student may take an Applied Music course without credit or on other than a letter grade basis. Repeatable. Prerequisites: MUSC 254 and permission of the instructor; open to Music Education, Music Therapy, Music Majors, and Music Minors only. Repeatable. F.S.

MUSC 354. Individual Lessons. 1 Credit.
Applied study of the stated instrument or voice at the junior level. Half hour lesson. For the final examination, the student will perform before a faculty committee (jury). No regular student may take an Applied Music course without credit or on other than a letter grade basis. Course is repeatable. Prerequisites: MUSC 254 and permission of the instructor; open to Music Education, Music Therapy, Music Majors, and Music Minors only. Repeatable. F.S.

MUSC 355. Individual Lessons. 4 Credits.
Applied study of the stated instrument or voice at the junior level for Bachelor of Music in Performance students and others. One-hour lesson. For the final examination, the student will perform before a faculty committee (jury). No regular student may take an Applied Music course without credit or on other than a letter grade basis. Prerequisites: MUSC 254 or MUSC 255. Corequisite: MUSC 354 or MUSC 355. S/U grading. F.S.

MUSC 454. Individual Lessons. 1 Credit.
Applied study of the stated instrument or voice at the senior level. Half hour lesson. For the final examination, the student will perform before a faculty committee (jury). No regular student may take an Applied Music course without credit or on other than a letter grade basis. Prerequisites: MUSC 354 and permission of instructor; open to Music Education, Music Therapy, Music Majors, and Music Minors only. Repeatable. F.S.

MUSC 455. Individual Lessons. 4 Credits.
Applied study of the stated instrument or voice at the senior level for Bachelor of Music in Performance students and others. One-hour lesson. For the final examination, the student will perform before a faculty committee (jury). No regular student may take an Applied Music course without credit or on other than a letter grade basis. Course is repeatable. Prerequisites: MUSC 354 and permission of the instructor. Repeatable. F.S.

MUSC 459. Senior Recital. 1-2 Credits.
The presentation of a senior recital. No regular student may take an Applied Music course without credit or on other than a letter grade basis. Prerequisite: MUSC 354 or MUSC 355. Corequisite: MUSC 454 or MUSC 455. S/U grading. F.S.

- In registering for private lessons in voice, piano, organ, or any band or orchestra instrument, “Voice” or the name of the instrument serves as the title of the course. An audition with appropriate Music Faculty is a prerequisite for all students’ enrollment in Individual Lessons. For the final examination, the student will perform before a faculty committee (jury).
- No regular student may take an Applied Music course without credit or on other than a letter grade basis.

Bachelor of Arts with a Major in Music

Required 120 credits (36 of which must be numbered 300 or above, and 30 of which must be from UND) including:

I. Essential Studies Requirements (see University ES listing).

II. The Following Curriculum:

Music majors must achieve a grade of C or better in every music course taken toward the degree in order to pass the Sophomore Proficiency.

Core Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUSC 130</td>
<td>Music Theory I</td>
<td>3</td>
</tr>
<tr>
<td>MUSC 131</td>
<td>Aural Skills I</td>
<td>1</td>
</tr>
<tr>
<td>MUSC 133</td>
<td>Keyboard Skills I (or Piano Proficiency Level I &amp; II)</td>
<td>1</td>
</tr>
<tr>
<td>MUSC 134</td>
<td>Music Theory II</td>
<td>3</td>
</tr>
<tr>
<td>MUSC 135</td>
<td>Aural Skills II</td>
<td>1</td>
</tr>
<tr>
<td>MUSC 136</td>
<td>Keyboard Skills II</td>
<td>1</td>
</tr>
<tr>
<td>MUSC 203</td>
<td>Music and Culture</td>
<td>3</td>
</tr>
<tr>
<td>MUSC 230</td>
<td>Music Theory III</td>
<td>3</td>
</tr>
<tr>
<td>MUSC 231</td>
<td>Aural Skills III</td>
<td>1</td>
</tr>
<tr>
<td>MUSC 234</td>
<td>Music Theory IV: Music Theory since 1900</td>
<td>3</td>
</tr>
<tr>
<td>MUSC 235</td>
<td>Aural Skills IV</td>
<td>1</td>
</tr>
<tr>
<td>MUSC 310</td>
<td>Music History Survey I</td>
<td>3</td>
</tr>
<tr>
<td>MUSC 311</td>
<td>Music History Survey II</td>
<td>3</td>
</tr>
<tr>
<td>MUSC 340</td>
<td>Introduction to Music Technology</td>
<td>2</td>
</tr>
<tr>
<td>MUSC 490</td>
<td>Seminar in Music</td>
<td>3</td>
</tr>
</tbody>
</table>

Other Supportive Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUSC 154</td>
<td>Individual Lessons (2 semesters)</td>
<td>2</td>
</tr>
<tr>
<td>MUSC 254</td>
<td>Individual Lessons (2 semesters)</td>
<td>2</td>
</tr>
<tr>
<td>MUSC Electives in Theory/Comp., History/Lit., Conducting or Applied</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Major Ensemble (4 semesters)</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>MUSC 492</td>
<td>Senior Project</td>
<td>2</td>
</tr>
</tbody>
</table>

Requisites in other departments

A concentration in a single supplementary field other than Music is also required of all Bachelor of Arts in Music majors. The concentration may be satisfied in one of two ways: 1) Level IV language proficiency in a modern foreign language; or 2) 20 credit hours, at least 9 of which must be numbered 300 or above in any single subject area* taught at this university.

Total Credits: 49

- Defined as courses with the same registration prefix or within a single degree major or minor area.

Students must take additional elective credits to fulfill the 120 credit hours required for degree completion.

Composition Emphasis

Must include the following courses, which may substitute for electives:
Bachelor of Music with Major in Music Education

Instrumental or Choral Emphasis

Required 120 credits (36 of which must be numbered 300 or above, and 30 of which must be from UND) including:

I. Essential Studies Requirements (see University ES listing).

II. The Following Curriculum:

Music majors must achieve a grade of C or better in every music course taken toward the degree in order to pass the Sophomore Proficiency.

Core Courses

MUSC 099 Program (Minimum 5 semesters required before Student Teaching) 0
MUSC 203 Music and Culture 3
MUSC 310 Music History Survey I and Music History Survey II 6
MUSC 256 Basic Conducting 2

Harmony and Theory Sequence

MUSC 130 Music Theory I 3
MUSC 134 Music Theory II 3
MUSC 230 Music Theory III 3
MUSC 234 Music Theory IV: Music Theory since 1900 3

Aural Skills Sequence

MUSC 131 Aural Skills I 1
MUSC 135 Aural Skills II 1
MUSC 231 Aural Skills III 1
MUSC 235 Aural Skills IV 1

Piano Proficiency through Level IV or Keyboard Skills Sequence:

MUSC 133 Keyboard Skills I 1
MUSC 136 Keyboard Skills II 1
MUSC 233 Keyboard Skills III 1
MUSC 236 Keyboard Skills IV 1

Professional Education

T&L 250 Introduction to Education 3
T&L 252 Child Development 3
T&L 386 Field Experience 1
T&L 433 Multicultural Education 3
T&L 486 Field Experience 1
T&L 487 Student Teaching 4
T&L 488 Senior Seminar 1

(See advisor for clarification.)

Emphasis

Select one emphasis from the options below (and optional track). 49-50

Total Credits 96-112

Instrumental Emphasis

This coursework meets the criteria for the Instrumental Licensure in Music Education in North Dakota.

Other Studies

MUSC 423 Instrumental and Choral Arranging 2
MUSC 427 Analysis of Musical Form 2

MUSC 417 Instrumental Literature 2

Performance

Major Instrument 7
Major Instrumental Ensemble 7
Piano as a secondary instrument (may include Keyboard Skills Sequence below) 4

MUSC 133 Keyboard Skills I 1
MUSC 136 Keyboard Skills II 1
MUSC 233 Keyboard Skills III 1
MUSC 357 Choral Conducting 4
MUSC 358 and Instrumental Conducting

Total Credits 1-2

Music Education

MUSC 140 Methods: Woodwinds, Brass, Strings, Percussion, Voice 5
MUSC 140 Methods: Woodwinds, Brass, Strings, Percussion, Voice 1

MUSC 180 Introduction to Music Therapy 3
MUSC 440 Methods and Materials for Elementary Music 3
MUSC 441 Methods and Materials for Middle and Secondary School Music 3
MUSC 446 Instrumental Classroom Methods and Materials 3

Music Technology

MUSC 340 Introduction to Music Technology 2

Total Credits 49-50

* Credits apply toward T&L 390 Special Topics

Optional Choral Licensure Track

This additional coursework meets the criteria for Choral Licensure in Music Education in North Dakota.

Vocal/Choral Option

MUSC 445 Choral Methods 3
MUSC 416 Choral Literature 2

Select one of the following:

MUSC 260 Concert Choir
MUSC 263 Varsity Bards Men’s Chorus
MUSC 264 Women’s Chorus
MUSC 357 Choral Conducting 2
MUSC 140 Methods: Woodwinds, Brass, Strings, Percussion, Voice 1

Total Credits 9

* Included in Instrumental Emphasis

Vocal/Choral Emphasis

This coursework meets the criteria for the Choral Licensure in Music Education in North Dakota.

Other Studies

MUSC 423 Instrumental and Choral Arranging 2
MUSC 427 Analysis of Musical Form 2

MUSC 423 Instrumental and Choral Arranging 2

Performance

Major Instrument or Voice 7
Major Choral Ensemble 7
Voice or Piano as a secondary instrument (may include Keyboard Skills Sequence below) 4

MUSC 133 Keyboard Skills I 1
MUSC 136 Keyboard Skills II 1
MUSC 233 Keyboard Skills III 1
MUSC 236 Keyboard Skills IV 1

Total Credits 1-2

Other Studies

MUSC 423 Instrumental and Choral Arranging 2
MUSC 427 Analysis of Musical Form 2
Bachelor of Music with Major in Performance

Required 120 credits (36 of which must be numbered 300 or above, and 30 of which must be from UND) including:

I. Essential Studies Requirements (see University ER listing).

II. The Following Curriculum:

Music majors must achieve a grade of C or better in every music course taken toward the degree in order to pass the Sophomore Proficiency.

Core Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUSC 099</td>
<td>Perform (Minimum 5 semesters required before graduation)</td>
<td>0</td>
</tr>
<tr>
<td>MUSC 203</td>
<td>Music and Culture</td>
<td>3</td>
</tr>
<tr>
<td>MUSC 310</td>
<td>Music History Survey I</td>
<td>6</td>
</tr>
<tr>
<td>MUSC 311</td>
<td>and Music History Survey II</td>
<td></td>
</tr>
<tr>
<td>MUSC 490</td>
<td>Seminar in Music</td>
<td>3</td>
</tr>
<tr>
<td>MUSC 256</td>
<td>Basic Conducting</td>
<td>2</td>
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</table>

Harmony and Theory Sequence

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUSC 130</td>
<td>Music Theory I</td>
<td>3</td>
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<td>Music Theory II</td>
<td>3</td>
</tr>
<tr>
<td>MUSC 230</td>
<td>Music Theory III</td>
<td>3</td>
</tr>
<tr>
<td>MUSC 234</td>
<td>Music Theory IV: Music Theory since 1900</td>
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</table>

Aural Skills Sequence

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUSC 131</td>
<td>Aural Skills I</td>
<td>1</td>
</tr>
<tr>
<td>MUSC 135</td>
<td>Aural Skills II</td>
<td>1</td>
</tr>
<tr>
<td>MUSC 231</td>
<td>Aural Skills III</td>
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<td>MUSC 235</td>
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</table>

Performance Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUSC 133</td>
<td>Keyboard Skills I</td>
<td></td>
</tr>
<tr>
<td>MUSC 136</td>
<td>Keyboard Skills II</td>
<td></td>
</tr>
<tr>
<td>MUSC 233</td>
<td>Keyboard Skills III</td>
<td></td>
</tr>
<tr>
<td>MUSC 236</td>
<td>Keyboard Skills IV</td>
<td></td>
</tr>
<tr>
<td>MUSC 444</td>
<td>Applied Music Pedagogy</td>
<td>2</td>
</tr>
<tr>
<td>MUSC 359</td>
<td>Junior Recital</td>
<td>1</td>
</tr>
<tr>
<td>MUSC 459</td>
<td>Senior Recital</td>
<td>1-2</td>
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</tbody>
</table>

Piano Proficiency through Level IV or Keyboard Skills Sequence

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUSC 133</td>
<td>Keyboard Skills I</td>
<td></td>
</tr>
<tr>
<td>MUSC 136</td>
<td>Keyboard Skills II</td>
<td></td>
</tr>
<tr>
<td>MUSC 233</td>
<td>Keyboard Skills III</td>
<td></td>
</tr>
<tr>
<td>MUSC 236</td>
<td>Keyboard Skills IV</td>
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</tbody>
</table>

Major Courses

Select one major from the options below.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUSC 242</td>
<td>Diction for Singers</td>
<td>2</td>
</tr>
<tr>
<td>MUSC 269</td>
<td>Opera Workshop</td>
<td>2</td>
</tr>
<tr>
<td>MUSC 278</td>
<td>Seminar for Collaborative Piano</td>
<td>8</td>
</tr>
<tr>
<td>MUSC 277</td>
<td>Chamber Music Groups</td>
<td>4</td>
</tr>
<tr>
<td>MUSC 415</td>
<td>Vocal Literature</td>
<td>3</td>
</tr>
<tr>
<td>Electives</td>
<td></td>
<td>5</td>
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</tbody>
</table>

Foreign Language Requirement

Select one of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FREN 101 &amp; FREN 102</td>
<td>First Year French I &amp; First Year French II</td>
<td></td>
</tr>
<tr>
<td>GERM 101 &amp; GERM 102</td>
<td>First Year German I &amp; First Year German II</td>
<td></td>
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</tbody>
</table>

Other Electives

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electives in disciplines other than the major</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 36

Instrumental Majors

Performance Courses on Primary Instrument

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUSC 278</td>
<td>Seminar for Collaborative Piano</td>
<td>8</td>
</tr>
<tr>
<td>MUSC 277</td>
<td>Chamber Music Groups</td>
<td>4</td>
</tr>
<tr>
<td>Electives - Keyboard must include:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MUSC 414</td>
<td>Piano Literature</td>
<td></td>
</tr>
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</table>

Other Electives

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electives in discipline other than the major</td>
<td>9</td>
<td></td>
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</table>

Total Credits 33

Minor in Music

College of Arts & Sciences

Required 20 credits:

<table>
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<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUSC 101</td>
<td>Fundamentals of Music</td>
<td></td>
</tr>
<tr>
<td>Electives - Musicanship (3-4 credits)</td>
<td></td>
<td>3-4</td>
</tr>
</tbody>
</table>

OR
One 3-credit course from each area.

Elective courses for the Certificate and Minor in Nonprofit Leadership. Choose one 3-credit course from each area.

Select one from each of the following:

Organizational

- POLS 200 Introduction to the Nonprofit Sector
- POLS 450 Capstone Experience and Development
- POLS 480 Administrative Internship

Total Credits 16-18

Elective courses for the Certificate and Minor in Nonprofit Leadership. Choose one 3-credit course from each area.

Select one from each of the following:

Organizational

- ESSP 160 Sustainability & Society
- ENTR 316 Entrepreneur Law & Operations
- A&S 294 Directed Studies
- ENTR 410 Marketing and Management Concepts for Entrepreneurship
- PSYC 301 Industrial and Organizational Psychology
- COMM 401 Organizational Communication

Total Credits 19-21

Note: Students may “double use” courses for the Certificate and for their majors or minors.
NURS 300. Nursing Pharmacology I. 3 Credits.
This is the first in a two part series of courses that reinforces the concepts of pharmacokinetics, pharmacodynamics, and introduces safe medication preparation, administration and documentation. Using a concept-based approach, examples of medications as they relate to major nursing concepts and human body systems across the lifespan will be discussed. This course will include classroom and laboratory experiences. Prerequisites: Admission to the undergraduate nursing program and PPT 315. Corequisites: NURS 300, NURS 301, NURS 310, NURS 312, and NURS 313. F,S.

NURS 310. Health & Illness I. 2 Credits.
This course introduces the student to the role of the generalist nurse in providing evidence-based interventions for patients in a variety of health care settings across the life span. The student will learn to recognize altered health states and understand interventions that will promote health, prevent disease/injury and restore a state of optimal health for individuals. Clinical reasoning skills will be developed, with a goal of achieving safe, quality outcomes. Prerequisite: Admission to the undergraduate nursing program. Corequisites: NURS 300, NURS 301, NURS 304, NURS 312, and NURS 313. F,S.

NURS 312. Pathophysiology I. 2 Credits.
This is the first in a two part series of courses that focuses on the concepts of altered health in the development of clinical manifestations of disease and illness throughout the lifespan. This course will explore altered function and structure of the human body using a conceptual approach. Prerequisite: Admission to the undergraduate nursing program. Corequisites: NURS 300, NURS 301, NURS 304, NURS 310, and NURS 313. F,S.

NURS 313. Clinical Practicum I. 2 Credits.
This clinical course initiates the student's journey in developing the generalist role as a provider of care. The student will learn to apply evidence-based knowledge, skills, attitudes and patient care technologies that will promote a state of optimal health for their patients. Students will professionally interact with individuals across the lifespan and in diverse populations to provide safe, quality and patient-centered care. Prerequisite: Admission to the undergraduate nursing program. Corequisites: NURS 300, NURS 301, NURS 304, NURS 310, and NURS 312. F,S.

NURS 324. Public Health Nursing Theory. 2 Credits.
The course emphasizes population-based health and the role of the public health nurse. Lecture. Corequisite: NURS 374. SS.

NURS 326. Evidence-Based Practice. 2 Credits.
The course focuses on evidence-based practice in nursing with the emphasis on the philosophy, models, and application of evidence to practice. Students will apply research findings, clinical expertise, and patient preferences to a clinical problem. S.

NURS 330. Health & Illness II. 4 Credits.
This clinical course focuses on developing the generalist role in managing patient care as a member of the health care team. The student will competently apply evidence-based knowledge, skills, attitudes and patient care technologies that will promote a state of optimal health for their patients. Students will professionally interact with individuals across the lifespan and in diverse populations to provide safe, quality and patient-centered care. Prerequisites: NURS 300, NURS 301, NURS 304, NURS 310, NURS 312, and NURS 313. Corequisites: NURS 334, NURS 332, NURS 333, and NURS 331. F,S,SS.

NURS 331. Patient & Family-Centered Nursing. 3 Credits.
This course focuses on compassionate, patient-centered, evidence-based care that respects patient and family preferences across the lifespan to achieve optimal healthcare outcomes. Prerequisites: NURS 300, NURS 301, NURS 304, NURS 310, NURS 312, and NURS 313. Corequisites: NURS 330, NURS 332, NURS 333, and NURS 334. F,S,SS.

NURS 332. Pathophysiology II. 2 Credits.
This is the second course in a two part series focusing on concepts of altered health in the development of clinical manifestations of disease and illness across the lifespan. Pathophysiological concepts of high incidence, prevalence and severity will be emphasized. Prerequisites: NURS 300, NURS 301, NURS 304, NURS 310, NURS 312, and NURS 313. Corequisites: NURS 330, NURS 331, NURS 333, and NURS 334. F,S,SS.
NURS 333. Clinical Practicum II. 4 Credits.
This clinical course focuses on developing the generalist role in managing patient care as a member of the health care team. The student will be competent in applying evidence-based knowledge, skills, attitudes, and patient care technologies that will promote a state of optimal health for their patients. Students will professionally interact with individuals across the lifespan and in diverse populations to provide safe, quality, and patient-centered care. Prerequisites: NURS 300, NURS 301, NURS 304, NURS 310, NURS 312, and NURS 313. Corequisites: NURS 330, NURS 331, NURS 332, and NURS 334. F,S,SS.

NURS 334. Nursing Pharmacology II. 2 Credits.
This is the second in a two-part series of courses that will advance student knowledge of pharmacokinetics, and pharmacodynamics by learning about different categories of drugs. Drug classifications provide the framework for understanding the action, use, adverse effects, and nursing implications of drugs. Using a concept-based approach, examples of medications as they relate to human body systems across the lifespan will be discussed. This course will include classroom and laboratory experiences. Prerequisites: NURS 300, NURS 301, NURS 304, NURS 310, NURS 312, and NURS 313. Corequisites: NURS 330, NURS 331, NURS 332, and NURS 333. F,S,SS.

NURS 350. Nursing in Transition. 3 Credits.
This course covers two distinct essentials for nurses returning for their bachelor's or master's degree. The first portion of the course explores concepts preparing the registered nurse student for entry into baccalaureate nursing and continuing socialization in the profession. The second portion provides an orientation to resources essential for successful program completion. F.

NURS 374. Public Health Nursing Clinical. 2 Credits.
Students will apply the concepts of population-based practice through various public health nursing roles. Clinical. Corequisite: NURS 324. SS.

NURS 393. Academic Nursing Internship. 1 Credit.
Academic Nursing Internship (ANI) integrates nursing knowledge, skills, and actions while working as a member of an interdisciplinary healthcare team. This course is designed to utilize the student's prior nursing course work to continue to develop clinical reasoning skills. Qualified nursing students are employed by selected healthcare agencies while enrolled in NURS 393 for academic credit. Hours are arranged by mutual agreement between student, ANI faculty coordinator, and employer. Prerequisites: Successful completion of first two semesters of nursing courses and consent of Nursing Department. Repeatable to 4 credits. F,S,SS.

NURS 394. Independent Study. 1-4 Credits.
Supervised independent study of non-honors students in nursing. Prerequisite: Only open to juniors and seniors in the nursing program. Repeatable to 9 credits. On demand.

NURS 397. Cooperative Education: Nursing. 1-2 Credits.
An experiential learning experience in nursing integrating clinical work experience, nursing theory, and evaluation. Designed to enhance the student's prior course work in nursing. Qualified nursing students are employed by selected healthcare agencies on either the parallel or summer plan. Hours are arranged by mutual agreement among student, coordinator, and employer. Clinical. Prerequisites: Successful completion of first two semesters of nursing courses and consent of Nursing Department. Repeatable to 24 credits. S/U grading. SS.

NURS 400. Special Topics. 1-4 Credits.
Elective opportunities offered in the College of Nursing which may be a combination of special projects, seminars, and clinical experience. Repeatable to 12 credits.

NURS 403. Nursing Across the Lifespan Practicum. 2 Credits.
This course expands the nursing students' knowledge about the healthcare continuum and patients throughout the lifespan through simulated and/or clinical interaction in diverse settings and specialty areas. Students will learn to integrate conceptual knowledge of altered health states as a basis for providing comprehensive care. Clinical reasoning skills will be applied to achieve safe, quality outcomes for patients in diverse populations with complex health conditions. Prerequisites: NURS 330, NURS 331, NURS 332, NURS 333, and NURS 334. Corequisites: NURS 404, NURS 406, NURS 420, NURS 430, and NURS 433. F,S.

NURS 404. Professional Nurse II. 2 Credits.
This course provides a focus on the refinement of the professional nursing role within a complex and dynamic health care environment. This is accomplished with exploration of health promotion, caregiving, safety systems, technology and informatics, and health care quality within the baccalaureate generalist practice roles. Prerequisites: NURS 330, NURS 331, NURS 332, NURS 333, and NURS 334. Corequisites: NURS 403, NURS 406, NURS 420, NURS 430, and NURS 433. F,S.

NURS 405. Informatics in Nursing. 3 Credits.
This web-enhanced course introduces students to the role of nursing informatics in identifying, collecting, processing, and managing information uniquely relative to nursing and healthcare. Students learn how to assess, develop, and use nursing information systems to work more efficiently and effectively, and to improve patient care. The learning environment emphasizes the development of proficiency in the use of the computer as a critical thinking and decision making tool. Prerequisites: Basic keyboarding and Internet utilization skills. S.

NURS 406. Evidence Informed Practice. 2 Credits.
Concepts of evidence-informed practice and nursing research are explored. Methods for critical appraisal of qualitative and quantitative research will be applied. Critical appraisal is performed to inform the delivery of safe and quality nursing care. Students will apply research findings, clinical expertise, and patient preferences to a clinical problem. Prerequisites: NURS 330, NURS 331, NURS 332, NURS 333, NURS 334, and SOC 326 or PSYC 241 or ECON 210. Corequisites: NURS 404, NURS 420, NURS 430, NURS 433, and NURS 403. F,S.

NURS 410. Clinical Reasoning for Safety and Quality Outcomes. 3 Credits.
This course emphasizes the development of higher level clinical reasoning skills with an outcome based focus on safety and quality. F.

NURS 415. Interprofessional Collaborations For Improving Health Care Systems Outcomes. 3 Credits.
Utilizing opportunities to collaborate with other health care professionals in their home communities and online, students will explore the theory and practice of improving health care systems while providing an opportunity for interprofessional educational experience. S.

NURS 420. Interprofessional Health Care. 1 Credit.
The focus of this course is learning to work effectively with an interprofessional health care team using a shared patient-centered approach. Case studies will be the primary teaching strategy. Professions include: physical therapy, nursing, occupational therapy, medicine, social work, communication science disorders, clinical lab science, physician assistant, and dietetics. Seminar. F,S.

NURS 430. Health & Illness III. 4 Credits.
This course is the third in a series using concept based curriculum exemplars to emphasize the nurse's role in managing the care of patients experiencing acute and chronic illness across the life span. Students will recognize complex altered health states and apply evidence-based interventions to promote a state of optimal health for their patients. Clinical reasoning skills will be broadened with a goal of achieving safe, quality outcomes for complex patient conditions. Prerequisites: NURS 330, NURS 331, NURS 332, NURS 333, and NURS 334. Corequisites: NURS 403, NURS 404, NURS 406, NURS 420, and NURS 433. F,S.

NURS 433. Clinical Practicum III. 4 Credits.
This clinical course broadens the student's development of clinical skills needed for safe, competent provision of care for diverse patients with multiple/complex problems across the life span. Students will work with other members of the inter-professional team to plan, implement, and evaluate safe, quality care for patients based on concepts that complement the Health Illness III course. The course emphasizes proficiency and efficiency in applying evidence-based knowledge, skills, attitudes and patient care technologies that will promote a state of optimal health for patients. Prerequisites: NURS 330, NURS 331, NURS 332, NURS 333, and NURS 334. Corequisites: NURS 403, NURS 404, NURS 406, NURS 420, and NURS 430. F,S.
NURS 441. Population Based Health. 3 Credits.
The course emphasizes population-based health and the role of the public health nurse. Concepts and theories related to providing health care to complex systems and aggregates in community, state, nation and world are explored. Concepts of evidence-informed practice and nursing research are explored with the use of population health data. Emphasis is placed on prevention, promotion and protection of health, utilizing epidemiological data to identify health risks of populations. Social determinants of health, as a basis for population health, are emphasized. Prerequisites: NURS 403, NURS 404, NURS 406, NURS 420, NURS 430, and NURS 433. Corequisites: NURS 450, NURS 442, NURS 443, and NURS 453. F,S.

NURS 442. Health Care Infrastructure. 3 Credits.
This course focuses on the baccalaureate nurse role in the broader context of a health care system. An overview of health care organizations and health care system infrastructure is examined. The role of health care economics, health care law, quality improvement, and regulatory policy that shape the nature, quality and safety of the practice environment are examined. Prerequisites: NURS 403, NURS 404, NURS 406, NURS 420, NURS 430, and NURS 433. Corequisites: NURS 441, NURS 443, NURS 450, and NURS 453. F,S.

NURS 443. Clinical Practicum IV. 2 Credits.
Concepts and theories from Population-Based Health are applied to the health care of individuals, groups, communities and populations. There is a concentrated focus on health promotion and disease/injury prevention. An epidemiological approach is used to analyze health problems at local, state, and national levels. Students apply knowledge of primary, secondary, and tertiary levels of prevention using a population-based perspective. Roles of public health nurses are studied and implemented through a variety of clinical experiences with public and private agencies. Prerequisites: NURS 403, NURS 404, NURS 406, NURS 420, NURS 430, and NURS 433. Corequisites: NURS 441, NURS 443, NURS 450, and NURS 453. F,S.

NURS 444. Baccalaureate Nursing Review Course. 1 Credit.
In this course, the student will participate in a comprehensive review and synthesis of nursing knowledge developed throughout the curriculum, and the study skills, stress management techniques and test-taking strategies that will prepare them for the National Licensure Examination-Registered Nurse (NCLEX-RN). Prerequisites or Corequisites: NURS 442 and successful completion of semester 3 nursing courses. F,S.

NURS 450. Transition to Practice: Seminar. 2 Credits.
This seminar course prepares students to transition from student status to a professional nursing role. It allows the student to synthesize and integrate previous learning experiences. Emphasis is placed on the role of the nurse as a provider of indirect and direct care, designer, manager and coordinator of care; and member of the profession. This writing intensive course along with Clinical Practicum V, is a UND Essential Studies Capstone requirement with an emphasis on advanced communication. Prerequisites: NURS 403, NURS 404, NURS 406, NURS 420, NURS 430, and NURS 433. Corequisites: NURS 441, NURS 442, NURS 450, and NURS 453. F,S.

NURS 453. Clinical Practicum V: Transition to Practice. 3 Credits.
A preceptor model of learning provides clinical opportunities to synthesize and integrate previous learning experiences. Emphasis is placed on the role of the nurse as a provider of indirect and direct care; designer, manager and coordinator of care; and member of the profession. The focus is on individual transition to the professional nursing role, recognizing the organizational, social, political, economic, ethical and legal context in which interdisciplinary health care is delivered in a selected clinical setting. Prerequisites: NURS 403, NURS 404, NURS 406, NURS 420, NURS 430, and NURS 433. Corequisites: NURS 441, NURS 442, NURS 443, and NURS 453. F,S.

NURS 474. Professional Development II. 3 Credits.
Focus is on the development of the professional nursing role within a complex and dynamic health care environment, with exploration of issues critical to leadership in nursing. Lecture/Discussion/Clinical. SS.

NURS 489. Senior Honors Thesis. 1-8 Credits.
Supervised independent study culminating in a thesis. Prerequisites: Nursing majors only; Consent of the department and approval of the Honors Committee. Repeatable to 9 credits. F,S.

NURS 490. Transcultural Health Care Theories, Research, and Practice. 3 Credits.
Analysis of theories, principles, and research related to transcultural health care. Students develop awareness of the biological, psychological, and sociological aspects of clients of selected cultural groups and identify their specific health care values and practices. Prerequisites: Nursing major and junior standing; or permission of instructor. F,S.

Bachelor of Science in Nursing
On-Campus Program

On-Campus Traditional BSN Program

The graduate receives the Bachelor of Science in Nursing (B.S.N.) degree and is eligible to take the NCLEX-RN, the national examination required for registered nurse licensure. UND Nursing programs are accredited by the Commission on Collegiate Nursing Education (CCNE) and are approved by the North Dakota Board of Nursing. Students must complete a formal application to the College of Nursing and Professional Disciplines (CNPD) and be approved for admission by the Nursing program before enrolling in the nursing curriculum. All persons who wish to apply for admission to the undergraduate nursing major are advised to be informed of all admission requirements and to follow the suggested curriculum leading to the Bachelor of Science in Nursing. All qualified students, whether currently enrolled at or planning to transfer to UND, are considered on merit. Since the College of Nursing and Professional Disciplines strives to reflect current trends in the nursing profession, there may be on-going changes in the curriculum. Information on any newly approved programs or changes in programs/major will be available on the Nursing website.

The nursing program admits students twice during the calendar year. The application deadline is February 1 (for admission to fall class), and July 1 (for admission to spring class). The application process is online and may be accessed at: http://app.cnpd.und.edu/application/.

Pre-Nursing Declaration

Students who wish to pursue an undergraduate degree in nursing must first apply to UND as a pre-nursing major in the College of Nursing and Professional Disciplines. Once the student has successfully been admitted to UND as a pre-nursing major, a nursing Office Student Services (OSS) advisor will be assigned.

Nursing Program Application

Students are admitted each semester based on availability of clinical and faculty resources. The nursing program admits students who meet criteria for direct admission and standard admission.

Direct Admission:

Direct admission is a criterion-based early admission program for pre-nursing students who have exemplary academic performance during high school. Direct admission will be offered to approximately the 20 most qualified candidates. Direct admissions will occur once per academic year in the fall semester. Students who are not selected for direct admission must apply for admission to the traditional BSN program through the standard admission process

Standard Admission:

The undergraduate nursing program admits students twice during the calendar year. The application deadlines are posted on the CNPD nursing website. The application process is online and may be accessed at: http://app.cnpd.und.edu/application/.

Core nursing prerequisite coursework may be repeated or withdrawn from a maximum of one time per course.

ENGL 110 College Composition I 3
ENGL 130 Composition II: Writing for Public Audiences 3
CHEM 115 Introductory Chemistry 4 & 115L and Introductory Chemistry Laboratory
or CHEM 121 General Chemistry I and General Chemistry I Laboratory
CHEM 116 Introduction to Organic and Biochemistry and Introduction to Organic and Biochemistry Laboratory
ANAT 204 Anatomy for Paramedical Personnel
PSYC 111 Introduction to Psychology
SOC 110 Introduction to Sociology or ANTH 171 Introduction to Cultural Anthropology or SOC 115 Social Problems
MATH 103 College Algebra
N&D 240 Fundamentals of Nutrition
MBIO 202 Introductory Medical Microbiology Lecture
MBIO 202L Introductory Medical Microbiology Laboratory
PPT 301 Human Physiology

* Refers to courses which are used in the “core” grade point average (GPA) calculation for admission.

Admission Acceptance Criteria

Upon notice of admission to the Traditional BSN On-Campus Nursing Program, students must submit the signed acceptance form and a non-refundable deposit by the date indicated on the Acceptance Form. Failure to return the acceptance form and deposit by deadline will result in loss of nursing placement. Current verifications and a designated background check, with acceptable results, will be required. Details regarding required immunizations and background check process will be provided in the admission packet.

The following courses or equivalents must be completed with a “C” or better prior to beginning nursing courses:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>PSYC 250</td>
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<tr>
<td>PPT 315</td>
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<td>SOC 326</td>
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<td>PPT 301</td>
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<tr>
<td>or PSYC 241</td>
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<td>or ECON 210</td>
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NOTE: Students will be automatically assigned to the UND catalog active at the time of admission to the Nursing program unless they request otherwise.

Admission Criteria for Transfer Nursing Students:

Students transferring to the nursing major from other accredited nursing programs must fulfill the same minimum prerequisite requirements as current University of North Dakota students. Transfer nursing students seeking admission to the UND nursing program must meet UND and standard admission criteria. Additional prerequisite courses will be required in accordance with the level of requested admission. Transfer nursing students must provide a letter of good standing from their prior nursing program. During the admission process, the student’s transfer work will be evaluated.

Additional Expenses

In addition to the regular university tuition and fees, nursing students are charged a nursing program fee each semester. Costs of laboratory tests, immunizations, and health insurance required for the protection of the student and patients are the responsibility of the student. There are additional expenses related to background checks, uniforms and clinical equipment, graduation, and licensure. An estimated program cost sheet is available from the College of Nursing and Professional Disciplines web pages. Students are responsible for transportation related to clinical experience. Use of a car, especially for public health nursing, is necessary. Students may complete the practicum course at a distant site which will require travel and housing costs associated with that affiliation.

Standardized Testing

To facilitate success on the licensure exam, students participate in standardized testing as they progress through the curriculum and prior to graduation.

Curriculum

Required 120 credits (36 of which must be numbered 300 or above) including:

I. Essential Studies (ES) Requirements, including 9 credits of Fine Arts and Humanities and 9 credits of Communication. A minimum of six (6) credits of the Essential Studies requirements must meet the US and Global Diversity designations (See University ES listing on web). The curriculum provides a framework for completion of ES requirements prior to beginning the undergraduate nursing curriculum. Completion of ES and general education requirements prior to beginning nursing courses is strongly encouraged.

II. A minimum overall grade point average of 2.75.

III. The following curriculum:

Freshman Year

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Credits</th>
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<tr>
<td>Pre-Nursing</td>
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<tr>
<td>ENGL 110</td>
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<td>CHEM 115</td>
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<td>CHEM 121L</td>
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<tr>
<td>PSYC 111</td>
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<td>SOC 110</td>
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<td>or ANTH 171</td>
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<td>MATH 103</td>
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Second Semester

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<td>Pre-Nursing</td>
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<td>ENGL 130</td>
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<tr>
<td>CHEM 116</td>
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<td>or 116L</td>
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<td>or CHEM 121</td>
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<td>ANAT 204</td>
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Sophomore Year

First Semester

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<tr>
<td>MBIO 202</td>
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<td>or 202L</td>
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<td>PPT 301</td>
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<tr>
<td>N&amp;D 240</td>
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Second Semester

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<th>Pre Nursing</th>
<th>Credits</th>
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<tr>
<td>PSYC 250</td>
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<td>or PSYC 241</td>
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<td>or SOC 326</td>
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<td>or ECON 210</td>
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<td>PPT 315</td>
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Essential Studies* | 6

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<tr>
<th>Credits</th>
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<td>16</td>
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</table>
Junior Year

First Semester

Nursing
NURS 300 Foundations of Nursing Practice 5
NURS 301 Professional Nurse I 2
NURS 304 Nursing Pharmacology I 3
NURS 310 Health & Illness I 2
NURS 312 Pathophysiology I 2
NURS 313 Clinical Practicum I 2
Total Credits 16

Second Semester

Nursing
NURS 330 Health & Illness II 4
NURS 331 Patient & Family-Centered Nursing 3
NURS 332 Pathophysiology II 2
NURS 333 Clinical Practicum II 4
NURS 334 Nursing Pharmacology II 2
Total Credits 15

Senior Year

First Semester

Nursing
NURS 403 Nursing Across the Lifespan Practicum 2
NURS 404 Professional Nurse II 2
NURS 406 Evidence Informed Practice 2
NURS 420 Interprofessional Health Care 1
NURS 430 Health & Illness III 4
NURS 433 Clinical Practicum III 4
Total Credits 15

Second Semester

Nursing
NURS 441 Population Based Health 3
NURS 442 Health Care Infrastructure 3
NURS 443 Clinical Practicum IV 2
NURS 444 Baccalaureate Nursing Review Course 1
NURS 450 Transition to Practice: Seminar 2
NURS 453 Clinical Practicum V: Transition to Practice 3
Total Credits 14

Total Credits 120

* Must be completed prior to admission to the Nursing program.
# Must be completed prior to beginning nursing courses.
** will also accept CHEM 122 General Chemistry II & CHEM 122L General Chemistry II Laboratory if BIOL 150 General Biology I & BIOL 150L General Biology I Laboratory and BIOL 151 General Biology II & BIOL 151L General Biology II Laboratory are also completed.

Students are encouraged to consider elective nursing courses such as Cooperative Education, Independent Study and Honors; students should obtain supplemental information from their faculty adviser.

Progression and Graduation Requirements

Students should note that nursing courses are sequenced to build on one another over four semesters. Careful attention should be paid to pre- and co- requisites. Each semester is to be completed in its entirety before progressing to the next semester. Students who need to extend or shorten the number of semesters to complete the curriculum, i.e., part-time attendance or LPNs, must see their OSS adviser.

1. A 2.75 overall GPA is required for progression in the nursing program at the end of each semester.
2. A student must attain a letter grade of at least a “C” in each of the courses required in the undergraduate nursing curriculum, including all the nursing and support courses, to progress to the next semester of nursing courses and for graduation from the College of Nursing and Professional Disciplines. A student earning a “D” or an “F” in any required nursing course may repeat the course only once.
3. A student may only repeat one required nursing course.
4. Benchmark scores on ATI progression assessments and predictor exam must be achieved or the remediation process successfully completed.

Students who do not meet the academic progression criteria will be placed on probation. The nursing program also reserves the right to place students on probation, to suspend, or to dismiss any student in nursing who does not meet the ATI content exam policy requirements, does not uphold professional standards or conduct, or whose performance in relation to client care is unsatisfactory. Additional details and any modifications in policies may be obtained from the Dean of the College, and are available in the College of Nursing and Professional Disciplines undergraduate student handbook.

Bachelor of Science in Nursing Online Program

RN to BSN Online Option

The RN/BSN option is designed for students who hold an associate (diploma) degree or diploma in nursing and are seeking to obtain a baccalaureate degree in nursing. Students in the RN/BSN option program may attend classes either full or part-time. Thirty one semester credits of UND nursing coursework are required (see below). In addition, students must complete all UND Essential Studies requirements, RN/BSN program pre-requisites and UND graduation requirements. A minimum of 120 credits and a minimum overall grade point average of 2.75 are required for graduation. Online tuition/fees and the nursing program fee apply.

RN to BSN Admission Process

Completed online applications received by July 1 will be considered for the following fall admission. Applications will be accepted once per calendar year. Applications are accepted from licensed RNs, from either an accredited Diploma program or an accredited Associate Degree Program. The application process is online and may be accessed at https://app.cnpd.und.edu/msbn_application.

RN to BSN Curriculum

1. Total 31 credits
2. Two options:
   a. Full-time (completion in 12 months)
   b. Part-time (completion in 24 months)

Courses are offered online through distance delivery. NURS 374 Public Health Nursing Clinical course requires daytime clinical hours and can be conducted in a community near the student based on agency availability and UND nursing program approval. UND may not be able to accommodate clinical experiences in some states due to specific state board of nursing regulations. For additional information, contact the College of Nursing and Professional Disciplines or visit the RN/BSN area on the College website.

Full-time Curriculum

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<thead>
<tr>
<th>Semester</th>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Summer</td>
<td>NURS 324 Public Health Nursing Theory</td>
<td>2</td>
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<tr>
<td></td>
<td>NURS 374 Public Health Nursing Clinical</td>
<td>2</td>
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<tr>
<td></td>
<td>NURS 474 Professional Development II</td>
<td>5</td>
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<tr>
<td>Fall</td>
<td>NURS 282 Health Promotion</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>NURS 302 Pathophysiology</td>
<td>3</td>
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<td></td>
<td>NURS 350 Nursing in Transition</td>
<td>3</td>
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<td></td>
<td>NURS 410 Clinical Reasoning for Safety and Quality Outcomes</td>
<td>3</td>
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<tr>
<td>Spring</td>
<td>NURS 326 Evidence-Based Practice</td>
<td>2</td>
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</tbody>
</table>
RN/BSN students must meet all UND Essential Studies Requirements in order to graduate with a BSN. CNPD has professional advisors who will work with RN/BSN students to assist them in meeting graduation requirements.

120 credits are required for graduation. 36 credits must be upper division (300 level or above). 30 credits must be UND credits.

**Nutrition and Dietetics (N&D)**

- B.S. in Dietetics (p. 179)
- B.S. in Human Nutrition (p. 178)
- Minor in Nutrition (p. 179)

**Courses**

**N&D 100. Introduction to Nutrition and Dietetics. 1 Credit.**

The philosophy, history, future trends, and career options in nutrition and dietetics will be discussed. S/U grading. S.

**N&D 220. Foodservice Safety and Sanitation. 1 Credit.**

The study of food safety and sanitation throughout the foodservice system. Upon successful completion of the course material and examination, the student will hold ServSafe® Certification. S.

**N&D 240. Fundamentals of Nutrition. 3 Credits.**

This introductory course focuses on basic elements of nutrition science. Emphasis is placed on nutrients, their functions and food sources, and discussion about how food behavior translates into nutritional health. The course also includes current topics such as fad diets, phytochemicals, and sports nutrition. Students learn to apply the principles of nutrition to their own food intake to improve their nutritional health. F,S,SS.

**N&D 250. Consumer Food Issues. 3 Credits.**

Students will explore all aspects of meal management with consideration of the importance of palatability and presentation of food as a means to improve nutritional status. Emphasis will be placed on preparing students with practical skills and knowledge needed to effectively assist consumers, clients and groups with informed food choices. Topics considered by the course include: food composition, purchasing, palatability and quality, meeting nutritional needs through menu planning, budgeting and organizational skills. The impact of various regulatory agencies on protection and distribution of the food supply will be examined. Content will be presented through classroom lectures and activities with opportunity to apply and develop skills in lab sessions. The course will meet for 2 hours of lecture and 2 hours of lab per week. Prerequisites: N&D 240. F.

**N&D 260. Principles of Foods and Food Science. 3 Credits.**

Introduction to food selection and preparation principles, sensory evaluation of food, role of ingredients, and food technology. Emphasizes application of scientific principles in relationship to food composition, physical properties, and chemical reactions during food preparation. Prerequisite: A college level chemistry course. S.

**N&D 325. Nutrition Through the Life Cycle. 3 Credits.**

Optimal growth and development throughout the lifespan requires proper nutrition that begins prior to conception. This course examines nutritional needs of Individuals prior to conception, during pregnancy and lactation, and throughout childhood, adolescence, and all of adulthood. The course will study the nutrient needs for each phase of the life cycle. Students will learn about the influence of nutrition on growth and development, as well as the physiological and developmental basis for food choice and dietary recommendations. Prerequisite: N&D 240. F.

**N&D 335. World Food Patterns. 3 Credits.**

Examination of the food patterns of selected world population groups considering the effect of social, cultural, and economic practices on nutritional values. F.

**N&D 344. Nutrition Education and Counseling. 3 Credits.**

Introduces students to counseling and learning theories for application with individuals and groups in clinical or community settings. Students will develop basic skills necessary to design and implement nutrition education programs and will practice application of principles learned in nutrition counseling. Prerequisite: N&D 240. F.
N&D 345. Community Nutrition. 3 Credits.
This course allows the student to develop the knowledge and skills necessary to plan programs and promote nutritional well-being to the public. Through readings, lectures and class discussions, students work in teams to select a community to assess, research it relative to interrelated health, social and economic concerns, and identify nutrition priorities that need to be addressed in that community. A graduated series of assignments culminates in a written program proposal and oral presentation to address the needs of the community. Students hone speaking and writing skills, and learn how to assess the work of others, to give helpful feedback, and to work effectively to complete group and individual assignments. Prerequisites or Corequisites: N&D 325 and N&D 344. F.

N&D 348. Sports Nutrition. 3 Credits.
Sports Nutrition is an overview of the specialized nutritional needs of recreational and competitive athletes. It presents the scientific basis for the role of food and nutrients during athletic training, performance, and recovery. Prerequisite: N&D 240. S.

N&D 350. Medical Nutrition Therapy I. 3 Credits.
An evidence-based study and application of the nutrition care process. This includes nutritional assessment techniques, pathophysiology in disease, and medical nutrition therapy for common medical conditions. Prerequisite: N&D 325 and PPT 301. F.

N&D 380. Food Service Production and Management. 3 Credits.
Introduces students to the many facets of a quality and quantity food service department. Course content will apply concepts learned in N&D 250 - Consumer Food Issues and N&D 260 - Food Science to food service in a quantity setting. Students will apply management principles to the food service environment. Prerequisites: N&D 250 and N&D 260. Prerequisite or Corequisite: MGMT 300. S.

N&D 441. Nutritional Biochemistry. 4 Credits.
A comprehensive investigation of the nutritional needs of humans with emphasis on nutritional biochemistry and current issues. Prerequisites: A grade of C or better in N&D 240, CHEM 116 or CHEM 340, and PPT 301. S.

N&D 450. Medical Nutrition Therapy II. 3 Credits.
An advanced level of evidence-based study and application of the nutrition care process. This includes pathophysiology in disease and medical nutrition therapy for medical conditions and comorbidities. Prerequisites: N&D 350 and N&D 441. F.

N&D 480. Interprofessional Health Care. 1 Credit.
The focus of this course is learning to work effectively with an interprofessional health care team using a shared patient-centered approach. Case studies will be the primary teaching strategy used. Prerequisite: Senior standing in Dietetics. S/U grading. F.

N&D 488. Foundations of Dietetic Practice. 3 Credits.
This course introduces the student to responsibilities associated with dietetic professional practice. Professional issues related to dietetic practice includes the Code of Ethics, legal credentialing (licensure laws), Standards of Professional Performance and future trends in the profession. The goal is to provide an opportunity for students to learn and continue to use professional skills and resources characteristic of nutrition and dietetics professionals in preparation for life-long learning. Prerequisites: Enrollment in the Coordinated Program in Dietetics; senior status. S.

N&D 494. Research in Nutrition and Dietetics. 1-4 Credits.
This course will provide an introduction to the research process, responsible conduct in research, and explore major types of study design in nutrition. Students will examine the literature to evaluate evidence about nutrition problems and interventions. Prerequisites: A minimum of 12 credits in Nutrition and Dietetics. Prerequisite or Corequisite: Completion of a statistics course. Repeatable to 4 credits. S.

N&D 497. Supervised Practice in Human Nutrition. 1-6 Credits.
Development of professional skills and competencies in human nutrition through supervised practice with learning experiences requiring knowledge and theory to be applied to simulated and real-life situations. Prerequisite: Enrollment in the Human Nutrition program; department consent required. Prerequisites or Corequisites: N&D 344 and N&D 345. Repeatable to 6 credits. On demand.

N&D 498. Supervised Practice in Dietetics. 1-12 Credits.
Development of professional skills and competencies through planned learning experiences in which knowledge and theory are applied to simulated and real-life situations in nutrition and dietetics. Prerequisite: Enrollment in the Coordinated Program in Dietetics; Dietetics majors require consent of instructor one semester prior to enrollment. Repeatable to 31 credits. F,S,SS.

N&D 499. Special Topics in Nutrition and Dietetics. 1-4 Credits.
Special topics and/or in depth independent study in selected content areas relative to nutrition and dietetics. Prerequisite: Instructor consent. Repeatable to 6 credits. On demand.

Bachelor of Science in Human Nutrition

Students must meet all University graduation requirements.

I. Required Courses:

<table>
<thead>
<tr>
<th>Course Code</th>
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<tbody>
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<tr>
<td>CHEM 340</td>
<td>Survey of Organic Chemistry</td>
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<td>Survey of Organic Chemistry Laboratory</td>
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<td>ANAT 204</td>
<td>Anatomy for Paramedical Personnel</td>
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<td>or PSYC 241</td>
<td>Introduction to Statistics</td>
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</table>

Total Credits 72

* CHEM 115 Introductory Chemistry, CHEM 115L Introductory Chemistry Laboratory and CHEM 116 Introduction to Organic and Biochemistry, CHEM 116L Introduction to Organic and Biochemistry Laboratory may be substituted for CHEM 121 General Chemistry I, CHEM 121L General Chemistry I Laboratory, CHEM 122 General Chemistry II, CHEM 122L General Chemistry II Laboratory, CHEM 340 Survey of Organic Chemistry, and CHEM 340L Survey of Organic Chemistry Laboratory.

II. Choice of either Option A or Option B.

Option A Health Promotion: Choose a minimum of five courses

<table>
<thead>
<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>N&amp;D 260</td>
<td>Principles of Foods and Food Science</td>
<td>3</td>
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<tr>
<td>N&amp;D 380</td>
<td>Food Service Production and Management</td>
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<tr>
<td>MGMT 300</td>
<td>Principles of Management</td>
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<td>PHE 301</td>
<td>Principles and Foundation of Health Education</td>
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<td>PHE 307</td>
<td>Methods and Materials of Health Education</td>
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<td>KIN 240</td>
<td>Introduction to Wellness</td>
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<td>T&amp;L 252</td>
<td>Child Development</td>
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<td>PSYC 250</td>
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<td>PSYC 355</td>
<td>Adulthood and Aging</td>
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<tr>
<td>SOC 352</td>
<td>Aging and Society</td>
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</table>
Bachelor of Science in Dietetics

Admission Requirements

1. Completion of prerequisite courses and currently enrolled or eligible for enrollment at UND.
2. Students must have a grade of "C" or better in undergraduate courses in nutrition and science courses. Recency of courses will be evaluated.
3. A cumulative Grade Point Average (GPA) of at least 3.0 for all undergraduate work (based on A=4.0).
4. Completion of 50 hours of service learning.
5. Submission of the online application materials including three letters of recommendation, a statement of goals, résumé, and service learning hour form.
6. Professional interview.
7. Student applying to the accelerated BSD/MSND program must meet minimum requirements for admission set by the School of Graduate Studies, including English proficiency.

Degree Requirements

Required 120 credits (36 of which must be numbered 300 or above, and 30 of which must be UND institutional credit) including:

I. Essential Studies Requirements (see University ES listing).

II. The following curriculum:

Pre-professional requirements:

Pre-Dietetics students complete required prerequisite courses during their first two years of enrollment at the University of North Dakota. Applications to the Coordinated Program in Dietetics are accepted annually with a due date of February 15th. Students typically apply during the spring semester of their sophomore year.

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II. Electives.

In consultation with an adviser, the student will select electives or a minor to meet the University minimum of 120 semester hours of credit and Essential Studies requirements for graduation.

Bachelor of Science in Dietetics

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Total Credits 66

Professional Dietetics Requirements:

Students must maintain cumulative GPA of 3.0 and a "C" grade or higher in all nutrition, science, and statistics courses. Students enrolled in the accelerated BS/MS program are required to take 24 credit hours of N&D 498.

<table>
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<td>SOC 326</td>
<td>Sociological Statistics</td>
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<td>PPT 315</td>
<td>Human Pharmacology</td>
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</table>

Total Credits 58-62

Minor in Nutrition

Students in other majors may elect to earn a minor in nutrition. The requirements of the minor are the completion of 20 semester hours of credit in nutrition-related courses. To develop the program of study, students should consult an adviser in the Department of Nutrition and Dietetics.

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A maximum of 4 credits from the following courses may be counted in the minor:

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<tbody>
<tr>
<td>CHEM 116</td>
<td>Introduction to Organic and Biochemistry Laboratory</td>
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Note: Other courses may be counted toward the minor with written approval of a faculty member in the Department of Nutrition and Dietetics.
Occupational Therapy (OT)

See School of Graduate Studies (p. 511) section

Peace Studies (PS)

GEOG 161. World Regional Geography. 3 Credits.
Development of the concept of region with analysis of the relationship of physical and cultural features to the contemporary world situation. F.S.

GEOG 250. Introduction to Geopolitics. 3 Credits.
As a branch of political geography, the study of Geopolitics is concerned with the spatial dynamics of power relations especially at the international level. From a geographic perspective, this course surveys changing relations among states and the influences of national and transnational actors and events. The course attempts to help students apply a broad range of theoretical perspectives to the analysis of global and regional issues and events, and develop insights into what is happening in the world today. From war and terrorism to economic globalization, human rights and sustainable development, this course will explore a myriad of important issues and challenges that face the world today. S.

PHIL 120. Introduction to Ethics. 3 Credits.
This course investigates the nature of the Good Life, of moral principles, and the application of moral systems to contemporary debate. These may include questions about the morality of war, capital punishment, sexual behavior, welfare, and so forth. F.S.

HIST 335. Nuclear Weapons and the Modern Age. 3 Credits.
An introduction to the history of: nuclear weapons and their delivery systems, their development and use during World War II, the nuclear arms race between the U.S. and the U.S.S.R., popular disarmament movements, and diplomatic efforts to control nuclear weapons and their proliferation. A final section will deal with the nuclear implications of the end of the Cold War and the development of new nuclear states in the last years of the 20th century. The course will include--from an historian's point of view--some technical material necessary to a reasonable and realistic understanding of the subject. S, even years.

HUM 283. Evidenced Based Reasoning Across Disciplines. 3 Credits.
In this course, students will examine chosen issues in the sciences, social sciences, and humanities and will gain a general familiarity with the academic and popular forms of writing, evidence based reasoning, and research in each discipline. They will become familiar with the research methodologies of each discipline and learn to integrate the different methods and perspectives with their own analysis. F.S.

PS 394. Independent Study. 1-4 Credits.
Supervised reading, study or research on an individual topic. Prerequisite: Consent of instructor. Repeatable to 6 credits. On demand.

IDS 491. Capstone Interdisciplinary Seminar. 1-3 Credits.
This seminar will be organized by the director of the Interdisciplinary Studies Program to act as a point of reference for students working on their Senior Projects in the program. The projects will vary from semester to semester, so the focus will shift accordingly. Not repeatable. Prerequisite: IDS 280. Corequisite: IDS 498. S.

PS 497. Internship. 3-16 Credits.
Provides direct experience in a peace-related, social change, human service/ human rights or international agency. Prerequisites: Junior standing and advisory approval. Repeatable to 16 credits. S/U grading. F.S.

HUM 408. Writing Across the Disciplines. 3 Credits.
This senior level course will provide students with an intensive writing experience that focuses on methods and strategies in the humanities, social sciences, and sciences. Students will gain an understanding of the theoretical underpinnings of the disciplines while they engage in the process of integrating disciplinary materials and writing tactics as well as formulating written responses to topics of current concern. Prerequisites: ENGL 120 or ENGL 125 or ENGL 130 and Junior/Senior standing. F.S.

IDS 495. Service and Citizenship. 3 Credits.
Students will design community service projects, or will join existing projects, and engage in volunteer action during the semester. Class meetings on campus will center on a critical discussion of volunteerism and community service; current literature on service learning will be studied. Self-assessment of experiential learning outcomes, as well as a portfolio and essay will be required. Prerequisite: Junior or Senior standing. F.S.SS.

Petroleum Engineering (PtrE)

B.S. in Petroleum Engineering (p. 182)

Certificate in Petroleum Engineering (p. 182)

Courses

PTRE 201. Introduction to Petroleum Engineering. 3 Credits.
Introducing students to the broad aspects of petroleum engineering. The student will gain an appreciation for exploration, discovery, and commercial recovery of oil and gas industry. Prerequisite: Petroleum Engineering major. Prerequisites or Corequisites: GEOL 101 or GEOE 210; all the prerequisites must be completed with a "C" or higher. S.

PTRE 201B. Introduction to Petroleum Engineering. 3 Credits.
Introducing students to the broad aspects of petroleum engineering. The student will gain an appreciation for exploration, discovery, and commercial recovery of oil and gas industry. S/U grading. S.

PTRE 301. Reservoir Rock Properties. 3 Credits.
Systematic theoretical and practical study of physical properties of petroleum reservoir rocks; lithology, porosity, relative and effective permeability, fluid saturations, capillary characteristics, compressibility, rock stress, and fluid-rock interaction. Prerequisites: PTRE 201, GEOE 210 or GEOL 101 and GEOL 101L, MATH 165; all the pre-requisites must be completed with a "C" or higher. F.

PTRE 301B. Reservoir Rock Properties. 3 Credits.
Systematic theoretical and practical study of physical properties of petroleum reservoir rocks; lithology, porosity, relative and effective permeability, fluid saturations, capillary characteristics, compressibility, rock stress, and fluid-rock interaction. S/U grading. F.

PTRE 311. Petroleum Fluid Properties. 3 Credits.
Phase behavior of naturally occurring hydrocarbon system; evaluation and correlation of physical properties of petroleum reservoir fluids under various conditions of pressure and temperature, including laboratory and empirical methods. Prerequisite: CHEM 122; all prerequisites must be completed with a "C" or higher. Corequisite: ME 341. Prerequisite or Corequisite: PTRE 301. S.

PTRE 311B. Petroleum Fluid Properties. 3 Credits.
Phase behavior of naturally occurring hydrocarbon system; evaluation and correlation of physical properties of petroleum reservoir fluids under various conditions of pressure and temperature, including laboratory and empirical methods. S/U grading. S.

PTRE 361. Petroleum Engineering Laboratory I. 1 Credit.
To introduce the students to different lab equipment in order to measure physical properties of the reservoir rock. Prerequisite or Corequisite: PTRE 301; all prerequisites must be completed with a "C" or higher. S.

PTRE 401. Well Logging. 3 Credits.
This course covers topics on methods of how to measure and interpret the physical and chemical properties of formation through the well logging tools. Prerequisites: PTRE 301; all prerequisites must be completed with a "C" or higher. F.

PTRE 401B. Well Logging. 3 Credits.
This course covers topics on methods of how to measure and interpret the physical and chemical properties of formation through the well logging tools. S/U grading. F.

PTRE 405. Petroleum Eng. Economy and Law. 3 Credits.
Presenting the principles of asset management with emphasize on applications to the upstream oil and gas activities and discussing the legal aspects of petroleum exploration and production in the US and internationally. F.
PTRE 405B. Petroleum Eng. Economy and Law. 3 Credits.
Presenting the principals of asset management with emphasize on applications to the upstream oil and gas activities and discussing the legal aspects of petroleum exploration and production in the US and internationally. S/U grading. F.

PTRE 411. Drilling Engineering. 3 Credits.
Concepts, processes, equipment, and engineering principals used to drill oil and gas wells and near-surface wells common in geotechnical, environmental, and water well applications. Prerequisites: GEOL 210 or GEOL 101, PTRE 201; all prerequisites must be completed with a "C" or higher. F.

PTRE 411B. Drilling Engineering. 3 Credits.
Concepts, processes, equipment, and engineering principals used to drill oil and gas wells and near-surface wells common in geotechnical, environmental, and water well applications. S/U grading. F.

PTRE 421. Production Engineering. 3 Credits.
Design, evaluation, and optimization of petroleum production system using nodal analysis. Analysis and design of well flow systems, artificial lift systems, and surface separation/treating facilities. Prerequisites: PTRE 431 and ME 306; all prerequisites must be completed with a "C" or higher. F.

PTRE 421B. Production Engineering. 3 Credits.
Design, evaluation, and optimization of petroleum production system using nodal analysis. Analysis and design of well flow systems, artificial lift systems, and surface separation/treating facilities. S/U grading. F.

PTRE 431. Reservoir Engineering. 3 Credits.
Discussing general concepts in reservoir engineering, material balance equation for oil, gas, and water, determining reserves under different drive mechanisms, and fluid flow in different oil and gas reservoirs. Prerequisites: PTRE 311. Prerequisite or Corequisite: ME 306; all prerequisites must be completed with a "C" or higher. F.

PTRE 431B. Reservoir Engineering. 3 Credits.
Discussing general concepts in reservoir engineering, material balance equation for oil, gas, and water, determining reserves under different drive mechanisms, and fluid flow in different oil and gas reservoirs. S/U grading. F.

PTRE 441. Petroleum Evaluation & Management. 3 Credits.
Expected value and investment decision analysis, estimation of oil and gas reserves, measures of profitability, production, decline curve analysis, and oil and gas reserves evaluations. Prerequisites: PTRE 311, PTRE 431, PTRE 411, and PTRE 421. S.

PTRE 441B. Petroleum Evaluation & Management. 3 Credits.
Expected value and investment decision analysis, estimation of oil and gas reserves, measures of profitability, production, decline curve analysis, and oil and gas reserves evaluations. S/U grading. On demand.

PTRE 445. Well Testing. 3 Credits.
Well test analysis using type curve techniques, Material balance for oil and gas reservoirs, Water influx calculations, Immiscible displacement and fractional flow calculations, Well test analysis to estimate reservoir properties, Pseudo functions, Enhanced oil recovery. Prerequisites: PTRE 431 and MATH 266 with a grade of C or higher. S.

PTRE 445B. Well Testing. 3 Credits.
Well test analysis using type curve techniques, Material balance for oil and gas reservoirs, Water influx calculations, Immiscible displacement and fractional flow calculations, Well test analysis to estimate reservoir properties, Pseudo functions, Enhanced oil recovery. S/U grading. S.

PTRE 451. Advanced Drilling Engineering. 3 Credits.
Advanced topics in drilling which are part of well construction will be covered in this course. The sequence of constructing a well will be discussed and practiced through class projects and assignments. Prerequisite: PTRE 411, all prerequisites must be completed with a "C" or higher. S.

PTRE 451B. Advanced Drilling Engineering. 3 Credits.
Advanced topics in drilling which are part of well construction will be covered in this course. The sequence of constructing a well will be discussed and practiced through class projects and assignments. S/U grading. S.

PTRE 461. Natural Gas Engineering. 3 Credits.
Estimation of gas properties; gas field development and material balance analysis; study of production and reservoir characteristics of gas and gas-condensate reservoirs; design and optimization of well bore and surface facilities for separation, processing, transportation, and metering; gas hydrates. Prerequisites: ME 306 and PTRE 311; all prerequisites must have a grade of C or higher. S.

PTRE 461B. Natural Gas Engineering. 3 Credits.
Estimation of gas properties; gas field development and material balance analysis; study of production and reservoir characteristics of gas and gas-condensate reservoirs; design and optimization of well bore and surface facilities for separation, processing, transportation, and metering; gas hydrates. S/U grading. S.

PTRE 462. Petroleum Engineering Laboratory II. 1 Credit.
To introduce the students to different lab equipment in order to measure geomechanical properties of the rock and flow behavior of the reservoir fluid. Prerequisites or Corequisites: PTRE 421 and PTRE 465. S.

PTRE 465. Petroleum Geomechanics. 3 Credits.
A brief review of fundamental of rock mechanics. The major focus of the course will be on different applications of Geomechanics in Petroleum Eng with focus on wellbore instability. Prerequisite: PTRE 411; all prerequisites must be completed with a "C" or higher. F.

PTRE 465B. Petroleum Geomechanics. 3 Credits.
A brief review of fundamental of rock mechanics. The major focus of the course will be on different applications of Geomechanics in Petroleum Eng with focus on wellbore instability. S/U grading. F.

PTRE 471. Numerical Reservoir Simulation. 3 Credits.
Use of mathematics and computer programs to solve reservoir flow problems. This course will discuss: Fundamental reservoir calculations, multiphase flow concepts, fluid displacement, fluid flow equations and discretization concepts, as well as history matching and reservoir performance forecast. Prerequisites: PTRE 431 and MATH 266; all prerequisites must be completed with a "C" or higher. F.

PTRE 471B. Numerical Reservoir Simulation. 3 Credits.
Use of mathematics and computer programs to solve reservoir flow problems. This course will discuss: Fundamental reservoir calculations, multiphase flow concepts, fluid displacement, fluid flow equations and discretization concepts, as well as history matching and reservoir performance forecast. S/U grading. F.

PTRE 475. Well Completions. 3 Credits.
Introduction to well problems including causes and remediation; near wellbore formation damage mechanism, control and prevention; sand and water production mechanisms; control and management; scale deposition removal and prevention; corrosion control and prevention; principles and practices of well worker and intervention operations; an overview of production logging tools and their various applications including production log interpretation, familiarization with new technology and reservoir stimulation by fracturing with emphasis on design and estimation; stimulation to improve productivity. Prerequisite: PTRE 421 with a grade of "C" or higher. S.

PTRE 475B. Well Completions. 3 Credits.
Introduction to well problems including causes and remediation; near wellbore formation damage mechanism, control and prevention; sand and water production mechanisms; control and management; scale deposition removal and prevention; corrosion control and prevention; principles and practices of well worker and intervention operations; an overview of production logging tools and their various applications including production log interpretation, familiarization with new technology and reservoir stimulation by fracturing with emphasis on design and estimation; stimulation to improve productivity. S/U grading. S.

PTRE 484. Research Design. 3 Credits.
This course is designed to prepare students to develop the essential skills in employing verbal and nonverbal communication in a variety of settings in academic and professional environments. Fundamentals of research methods, research design and also the essential written communication skills are taught to provide a basis for students to apply and practice communication principles in several informative and persuasive presentations that are focused, well organized, substantially supported and confidently delivered throughout the semester. In this course, students will learn and practice the essential skills that are required for the successful completion of the final year engineering design Capstone course and must be undertaken prior to PTRE 485 Senior Design. In the meantime, students in this course will work on assignments that will be used and are integral part of next semester's PTRE 485 Senior Design. Prerequisites: PTRE 401 and GEOL 407; all prerequisites must be completed with a "C" or higher. F.
PTRE 485. Senior Design. 3 Credits.
This is a capstone design course in the Petroleum Engineering program. This course is a continuation of PTRE 484 taken in the preceding semester. It includes: Defining the design problem, establishing design objectives, evaluating alternatives, specifying constraints, determining a methodology, and completing a formal design problem statement. Prerequisites: PTRE 484, PTRE 405, PTRE 421, PTRE 451, PTRE 465, and PTRE 471; all prerequisites must be completed with a "C" or higher. S.

PTRE 493. Selected Topics in Petroleum Engineering. 1-4 Credits.
Detailed study of selected topics in Petroleum Engineering. Includes laboratory if applicable. Repeatable up to a maximum of 6 credits. Prerequisite: Consent of the instructor. Repeatable to 6 credits. On demand.

Bachelor of Science in Petroleum Engineering

Required 129 credits (36 of which must be numbered 300 or above and 60 of which must be from a 4-year institution) including:

I. Essential Studies Requirements (see University ES listing).

II. The Following Curriculum:

All students must meet each semester with their academic advisor.

Freshman Year

Fall Credits
GEOE 210 Earth Dynamics & Geophysics 4
MATH 165 Calculus I 4
ENGL 110 College Composition I (Essential Studies) 3
CHEM 121 General Chemistry I 4 & 121L and General Chemistry I Laboratory (ES=Q) 3
Arts & Humanities Elective 3

Spring
PTRE 201 Introduction to Petroleum Engineering 3
ENGR 200 Computer Applications in Engineering 2
MATH 166 Calculus II 4
PHYS 251 University Physics I 4
CHEM 122 General Chemistry II 4 & 122L and General Chemistry II Laboratory 3
Arts & Humanities Elective 3

Credits 18

Sophomore Year

Fall
ENGR 201 Statics 3
PTRE 301 Reservoir Rock Properties 3
MATH 265 Calculus III 4
PHYS 252 University Physics II 4
ME 341 Thermodynamics 3

Credits 17

Spring
PTRE 311 Petroleum Fluid Properties 3
PTRE 361 Petroleum Engineering Laboratory I 1
MATH 266 Elementary Differential Equations 3
ME 306 Fluid Mechanics 3
ENGR 203 Mechanics of Materials 3
GEOL 407 Petroleum Geology 3

Credits 16

Junior Year

Fall
PTRE 401 Well Logging 3
PTRE 431 Reservoir Engineering 3
PTRE 411 Drilling Engineering 3

GEOL 520 Statistical Applications in Geology 3
or MATH 321 or Applied Statistical Methods 3
or CHE 315 or Engineering Statistics and Design of Experiments 3
Arts & Humanities Elective 3

Credits 15

Senior Year

Fall
PTRE 421 Production Engineering 3
PTRE 465 Petroleum Geomechanics 3
PTRE 484 Research Design 3
PTRE 471 Numerical Reservoir Simulation 3
PTRE 405 Petroleum Eng. Economy and Law 3

Credits 15

Spring
PTRE 485 Senior Design 3
PTRE 475 Well Completions 3
PTRE 462 Petroleum Engineering Laboratory II 1
CHE 340 3
Arts & Humanities Elective 3
Technical Elective 3

Credits 16

Total Credits 129

* ES = represents courses satisfying the Essential Studies requirements of the University.

Approved Electives for Petroleum Engineering

Approved Courses for Technical Elective
PTRE 461 Natural Gas Engineering 3
PTRE 493 Selected Topics in Petroleum Engineering 1-4
CE 431 Environmental Engineering I 3
GEOG 474 Introduction to Geographic Information Systems (GIS) 3
& 474L and GIS Laboratory 3

Geology courses 300 level or higher may be used as technical electives, dependent upon departmental approval.

* All ENGR and Geol courses must be completed with a grade of "C" or better.

Certificate in Petroleum Engineering

Admission Requirements

1. Interest in learning about Petroleum Engineering Topics.
2. Adequate experience in the field of petroleum engineering.

Certificate Requirements

1. A total of sixteen (16) credit hours must be completed from the following courses in the PE undergraduate curriculum:

2. Courses must be passed with the following requirements below:

Courses shall only count as credit toward fulfilling the requirements listed above when a grade of S (for S/U) or C or higher has been awarded at the completion of the course.

**Pharmacology, Physiology and Therapeutics (PPT)**

**Undergraduate Courses**

**PPT 301. Human Physiology. 4 Credits.**
A study of the normal function of the human body with particular consideration given to the necessary background needed by students pursuing a course of study in Allied Health Sciences. There are five hours of formal classroom study including two hours of laboratory and an optional review period each week. Prerequisites: ANAT 204 and either BIOL 150/150L or CHEM 116/116L or CHEM 121/121L; open to Athletic Training, CLS, Community Nutrition, Cytotechnology, Dietetics, Pre-Dietetics, Nursing, Pre-Nursing, Pre-OT, PT, and OT majors only, F.S.

**PPT 315. Human Pharmacology. 3 Credits.**
A survey of the more important drugs used in medicine, including basic principles, clinical uses and possible adverse effects. Prerequisites: PPT 301 and CHEM 116 and CHEM 116L, or CHEM 121 and CHEM 121L, or CHEM 122 and CHEM 122L. S.

**PPT 410. Drugs Subject to Abuse. 2 Credits.**
Biochemical, pharmacological, behavioral and therapeutic aspects of substance abuse. Prerequisite: Advanced undergraduate standing. S.

**PPT 499. Readings in Pharmacology, Physiology and Therapeutics. 1-4 Credits.**
Topics and credits to be arranged with the instructor. Prerequisite: Consent of instructor. Repeatable to 4 credits. F,S,SS.

**Philosophy and Religious Studies (Phil)**

**B.A. with Major in Philosophy and Religious Studies: Philosophy Concentration** (p. 185)

**B.A. with Major in Philosophy and Religion: Religious Studies Concentration** (p. 186)

**B.A. with Major in Philosophy and Religious Studies: Pre-Law Concentration** (p. 185)


Minor in Philosophy & Religious Studies: Philosophy Concentration (p. 186)
Minor in Philosophy & Religion: Religious Studies Concentration (p. 186)
Minor in Ethics (p. 186)

**Philosophy**

**PHIL 101. Introduction to Philosophy. 3 Credits.**
An introductory survey of the discipline of philosophy. Students will join the thoughtful search, in which philosophers have engaged through reading and discussion since ancient days, into the problems of reality (metaphysics), of truth and meaning (logic and philosophy of language), of moral standards (ethics), of knowledge (epistemology), of beauty (aesthetics), and other fundamental questions, F.S.

**PHIL 110. Forward or Delete? An Introduction to Logic. 3 Credits.**
A theoretical and practical introduction to the principles of reasoning—formal and informal, deductive and inductive. Students will study language and patterns of reasoning as vehicles for and obstacles to critical thinking. The central characteristics of deduction and validity; the role of hypotheses, inductive reasoning, probability estimates in scientific and quasi-scientific investigations and other models of critical thinking and their limits will be covered. F.

**PHIL 120. Introduction to Ethics. 3 Credits.**
This course investigates the nature of the Good Life, of moral principles, and the application of moral systems to contemporary debate. These may include questions about the morality of war, capital punishment, sexual behavior, welfare, and so forth. F,S.

**PHIL 130. Introduction to Political Philosophy. 3 Credits.**
An exploration of the central themes in political theory. Students will study topics such as justification of the state, liberty, justice, equality, rights, democratic participation. The course will include readings from classic and contemporary philosophers, emphasizing the connection between the theoretical issues addressed and contemporary political debates. S.

**PHIL 240. Getting Fit with Aristotle. 3 Credits.**
How excellent a person are you? Can you become better? These are the questions Aristotle asks in his Ethics. In this course, we will read Aristotle to see if his words can actually improve us. We will supplement his classic text with more modern studies in fitness, nutrition, friendship, cognitive science, food, and other topics. Additionally, this course is geared towards skills-development. It is designed to foster argumentation, writing, comprehension, and oral skills through in-depth reading, writing, and oral assignments. Students are expected to be able to understand challenging texts and write summaries, comparisons, and criticisms that represent both the philosopher's ideas and the students' own observations about those ideas. On demand.

**PHIL 253. Environmental Ethics. 3 Credits.**
The course centers on the way that ethics helps us to understand environmental issues. We examine a broad cross-section of environmental issues from a variety of traditional and contemporary ethical frameworks. Issues include sustainability, animal rights, energy consumption, habitat loss, biodiversity, land conservation, and pollution. Class members will explore such issues through case studies in a context of relevant ethical history and theory. Offered Fall every 3 years.

**PHIL 282. Asian Philosophy. 3 Credits.**
Study of major philosophical systems of India, China and/or Japan. On demand.

**PHIL 300. History of Philosophy I (Ancient/Modern). 3 Credits.**
The ancient Greeks and Romans laid the foundations for even The focus on Ancient Philosophy will investigate the foundations of Western philosophy through the study of ancient Greek and Roman thinkers like Socrates, Plato, Aristotle, Cicero, Lucretius, and Seneca, who raised and attempted to answer questions about topics such as the nature of truth and knowledge; what is and how can we live the good life; and what is justice. The focus on Modern Philosophy will highlight 17th and 18th century rationalist and empiricist philosophers like Descartes, Spinoza, Leibniz, Hume, and Kant. Their influence on Enlightenment thought, including issues like doubt, certainty, free-will, perception, and belief will be explored in this version of the course. Course is repeatable, given the different emphases of Ancient and Modern Philosophy (Fall of odd years will be Ancient, even years will be Modern). Repeatable to 6 credits. F.

**PHIL 301. History of Philosophy II (Medieval/19th Century). 3 Credits.**
The focus on Medieval Philosophy will examine philosophical arguments on the existence of God, concepts of the afterlife; arguments on whether humans have free-will or are subject to pre-destination, and the nature of sin, morality, and forgiveness, among other topics. Representative Medieval thinkers that may be studied include: Aquinas, Anselm, Augustine, Boethius, Dante, Ibn Tufayl, and Plotinus. The focus in the 19th Century Philosophy will cover how philosophers responded to Kant's Enlightenment philosophy and the growing challenges to traditional value systems, paying special attention to the formation of the modern Western subject and the philosophy of history. Thinkers covered will include: Kant, Hegel, Feuerbach, Kierkegaard, Nietzsche, Marx, and Freud. Course is repeatable, given the different emphases of Medieval and 19th Century Philosophy (Spring of even years will be Medieval, odd years will be 19th Century.). Repeatable to 6 credits. S.
PHIL 304. Existentialism & Phenomenology. 3 Credits.
The focus on Existentialism will explore questions about human existence and its relationship to experiences like freedom, solitude, anxiety, disgust, boredom, and personal identity. By examining the works of such philosophers and literary figures as Kafka, Dostoevsky, Kierkegaard, Nietzsche, Sartre, Camus, and Beauvoir, students will investigate the ways in which humans construct identity and meaning, often in the face of a seemingly absurd world. The focus on Phenomenology will explain phenomenology as a method that attempts to describe these lived human experiences from the embodied subject's point of view. Students will practice phenomenology as part of the class by undertaking guided experiments of description and narration. The course may investigate common human experiences of empathy, self-deception, forgiveness, fear, desire, or hospitality, through accounts by thinkers like Husserl, Levinas, and Merleau-Ponty. The course is repeatable, given the different emphases of Existentialism and Phenomenology. Repeatable to 6 credits. S, odd years.

PHIL 310. Philosophy of Art, Literature, & Film. 3 Credits.
This course will investigate philosophical questions pertaining to artistic expression (aesthetics), including the visual arts (e.g., painting, sculpture, and film), literature, and music. Questions that may be explored include: whether definitions of art or beauty are possible; what the relationship between form and substance is in art; whether or not art should be valued as a product or process; how have new technologies affected art and its reception in society; and what role, if any, does art play in politics. This course will utilize representative texts from the history of philosophy, as well as a variety of examples from the arts. The course is repeatable when the course topic is different. Repeatable to 6 credits. S, even years.

PHIL 312. American Philosophy. 3 Credits.
This course will consider some of the major figures of 20th and 21st century American Philosophy and Pragmatism through the theme of democracy and its relation to education, along with related issues of privilege/class/race in the U.S.; protest movements and activism; anti-intellectualism; and individualism and the common good. Philosophers studied may include: Ralph Waldo Emerson, Henry David Thoreau, William James, Jane Addams, James Baldwin, John Dewey, W. E. B. Du Bois, and Cornel West. F, odd years.

PHIL 315. Philosophy of Race & Postcolonialism. 3 Credits.
This course will investigate philosophical issues surrounding race, racism, and postcolonialism. Topics that may be explored include: the role philosophers have played historically in shaping these discourses and practices; epistemic foundations for the concept of race; scientific treatments of race; theories of civilization, nationalism, and ethno-nationalism; and the ethical, social, and political consequences of race-thinking and postcolonialism and contemporary philosophical responses. Repeatable to 6 credits. F, even years.

PHIL 331. Contemporary European Philosophy. 3 Credits.
This course will investigate philosophical trends in contemporary (i.e., late 20th century until the present) European philosophy (aka Continental Philosophy). Students will read recent philosophical works on timely thematic issues such as: technology and society; identity; political sovereignty and resistance; theories of language and communication; and the nature of power. Repeatable to 6 credits. F, odd years.

PHIL 342. Advanced Ethics. 3 Credits.
This course will examine contemporary (20th and 21st century) ethical theories as well as moral problems affecting societies around the world. Topics may include human rights, sexual ethics, ethical consumerism, and ways in which science and technology have affected moral deliberation and judgment. S, odd years.

PHIL 355. Social and Political Philosophy. 3 Credits.
This course examines core issues in society and governance: the nature of justice, the limits of freedom, the role of religion, family and pluralism in the modern community, are a few examples of possible topics. Students in the course may examine both classical and contemporary theories of political society. Offered Fall every 3 years (2008).

PHIL 360. Feminist Philosophy. 3 Credits.
This course will investigate theories and major ideas of feminist philosophers. The course may be approached as an historical examination of the different "waves" of feminism, or topically, by considering themes like: women and the body, the feminine and the spirit, philosophy of sex/gender, feminist art, postmodern feminism, etc. Central figures in feminist philosophy who may be studied include: Charlotte Perkins Gilman, Simone de Beauvoir, Susan Bordo, Catharine MacKinnon, Luce Irigaray, Audre Lorde, Judith Butler, Donna Haraway, Sara Ahmed, and Chandra Talpade Mohanty. S, even years.

PHIL 371. Philosophy of Law. 3 Credits.
An investigation of the nature of both law and legal reasoning. Study of the nature of law focuses on theories of natural law, legal positivism, and legal realism. Legal reasoning concerns justified interpretation of precedent and statute within the common law tradition. Additional topics dealt with as time allows, encompass such issues as the justification of punishment and enforcement of morality. S, even years.

PHIL 450. Philosophy, Economics, and Politics. 3 Credits.
This course provides an introduction to the discipline sometimes called "political economy" and illustrates its connection to political philosophy in general. It focuses on the relationship between political and economic structures, with a special emphasis on the nature and problems of liberal capitalist democracies. Students will read classic and contemporary thinkers, and primary and secondary sources. Offered Spring every 3 years.

PHIL 451. Current Topics in Political Philosophy. 3 Credits.
This course provides an in-depth study of the nature of citizenship, with special emphasis on how citizens deliberate collectively and individually. It focuses on questions of rationality, political activism, political education, and cosmopolitanism. Students will read classic and contemporary thinkers, and primary and secondary sources. Repeatable to 6 credits. On demand.

PHIL 480. Public Philosophy. 3 Credits.
Public philosophy is the process of engaging in philosophical reflection with non-philosophers. This course provides the opportunity for students to take existing work in academic philosophy and "translate" it into more accessible media. Students will write magazine articles, blog entries, opinion pieces suitable for newspapers, and engage in other activities that help philosophy expand past its home at the university. Prerequisite: 75 total credit hours. F.

Religious Studies

PHIL 103. Introduction to Religious Studies. 3 Credits.
This course is designed as an introduction to the academic study of religion. Topics discussed include problems with defining "religion," approaches to the subject in the humanities and social sciences, and the roles played by religion in the contemporary world. F,S.

PHIL 104. Religions of the West. 3 Credits.
This course is an introduction to the comparative study of the many cultural manifestations of Judaism, Christianity, and Islam. S.

PHIL 105. Religions of Asia. 3 Credits.
This course is an introduction to the characteristic beliefs and practices of selected religions that developed in Asia: Hinduism, Buddhism, Confucianism, Daoism, and Shinto. We will devote special attention to scriptures and other classic literature of the traditions. Students will gain an appreciation of the vitality and enduring significance of each of the religions as a way of life for large numbers of people. F.

PHIL 201. Introduction to the Bible. 3 Credits.
This course is designed to introduce the student to the academic study of the Bible and to the relevant comparative material drawn from the surrounding cultures. F.

PHIL 216. Sex, Gender, and Religion. 3 Credits.
This course presents issues generated by the interrelationship of sex, sexual orientation and gender with religion. Included in our investigation are examination of the various interpretations of sacred texts which produce discourses of sexual control, establish moral authority and seek to define sexual identity. Other discourses are those created from other religious experiences and therefore resist those of the dominant society. On demand.

PHIL 217. Religion in America. 3 Credits.
This course examines the role that religion has played in the political, social, cultural, and intellectual history of America. F.

PHIL 227. Mysticism and Spirituality in Religion. 3 Credits.
A study of mystics and their writings from the Eastern and Western traditions and the application of methods of religious inquiry into the presence of mystical phenomena. S, even years.

PHIL 245. Death and Dying. 3 Credits.
An examination of various perspectives on death and dying in our own and other cultures with a view to coping with the problems of mortality and immortality. Medical, psychological, philosophical, and religious aspects contributing to an understanding of the meaning of death will be offered by resource people whose experience will lend assistance to the student's confronting the reality of death and dying. Lecture and discussion. F.
Philip 110: Forward or Delete? An Introduction to Logic

3

Philip 120: Introduction to Ethics

3

Philip 300: History of Philosophy I (Ancient/Modern)

3

Philip 301: History of Philosophy II (Medieval/19th Century)

3

Philip 480: Public Philosophy (Capstone)

3

Advanced Philosophical Study (an additional 15 credits in Philosophy numbered 300 or higher)

15

Religious Studies Electives (6 credits in Religious Studies numbered 200 or higher)

6

Total Credits

36

Courses in Philosophy

Since a major in philosophy involves a rigorous study of basic questions about human life and action, knowledge, truth, and values, it is recognized as providing a sound base for those who plan to continue their education in one of the professionals specialties such as law, medicine, or the ministry. More recently, liberal arts degrees in fields which "make you think" have become increasingly valued in business and government. Majoring in philosophy also prepares a student for graduate work in any of the humanities (most notably philosophy); in most cases the graduate will pursue a doctoral degree to teach at the college level.

Students majoring in other fields who find themselves seriously interested in the theoretical aspects of their disciplines — e.g., ethical implications of practice, the functions of knowledge in the field, the legitimacy of methods — may want to consider a special concentration, minor, or second major in philosophy to explore that interest.

Bachelor of Arts with Major in Philosophy and Religious Studies: Pre-Law Concentration

Required 120 credits (36 of which must be numbered 300 or above, and 30 of which must be from UND) including:

I. Essential Studies Requirements (see University ES listing).

II. Philosophy Concentration requirements.

36 major hours, including:

Required Courses:

Philip 110: Forward or Delete? An Introduction to Logic

3
Religious Studies at the University are seen as creative, living modes of experience, culture, beliefs, rituals and ethics—that enable people around the globe to make sense of their lives. By studying, and to a limited degree projecting ourselves into, various religions, we are better able to appreciate the outlooks and values of other societies and gain new insight into what gives meaning and worth to our own lives. The academic study of religion is not based upon assumptions regarding the truth or falsity of any particular religious tradition. Rather, we guide students to learn a variety of scholarly approaches in order to develop their own critical understandings of the subject.

The study of religion is an integral part of a liberal education. It is also an enrichment for courses of study in preparation for careers in business, education, health care, social and psychological services. Courses in religion are a good preparation for many areas of postgraduate studies, including law, medicine, and the ministry. Our curriculum is designed to prepare students to engage actively as responsible citizens in the global community.

### Minor in Ethics

Ethics, the study of right action and the good life, lies at the core of the human experience. It is also essential for those who wish to engage in business, politics, relationships, and self-examination. What ought we to do? How should we live? When should we help others and how often should we help ourselves? Everyone has asked these questions but few have allowed themselves the opportunity to really study them and to examine their own beliefs. The minor in ethics provides just such an occasion.

Through the minor in ethics, students will be able to examine classic texts (of philosophy, religion, and other subjects) and apply their lessons to day-to-day life. Through debates and discussions, students and teachers will identify the assumptions and beliefs that guide people’s actions and ask whether some are preferable to others or, even, whether any ethical approach is defensible at all. The classes in the minor work well with those of other disciplines—whatever your major, ethics can help you do your job better, learn more from your current classes, and prepare yourself for whatever comes your way.

**Required Courses:**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHIL 120</td>
<td>Introduction to Ethics</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 130</td>
<td>Introduction to Religious Studies</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 342</td>
<td>Advanced Ethics</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 480</td>
<td>Public Philosophy</td>
<td>3</td>
</tr>
</tbody>
</table>

Select three of the following:

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
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<td>Introduction to the Bible</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 334</td>
<td>Judaism</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 338</td>
<td>Christianity</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 356</td>
<td>Islam</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 104</td>
<td>Religions of the West</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 316</td>
<td>Daoism and Confucianism</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 320</td>
<td>Hinduism</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 380</td>
<td>Buddhism</td>
<td>3</td>
</tr>
</tbody>
</table>

Students may elect any 15 credits in Religious Studies not to include the 6 required credits (PHIL 103 and PHIL 485), the 3 required credits in Western Traditions, and the 3 required credits in Asian Traditions. Students may elect any 9 credits of Philosophy courses.

**Total Credits** 36

### Minor in Philosophy and Religious Studies: Philosophy Concentration

**Required 21 credits including:**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
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</tr>
</thead>
<tbody>
<tr>
<td>PHIL 103</td>
<td>Introduction to Religious Studies</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 354</td>
<td>Contemporary European Philosophy</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 380</td>
<td>Buddhism</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 316</td>
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<td>PHIL 320</td>
<td>Hinduism</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total credits** 21

### Minor in Philosophy and Religion: Religious Studies Concentration

**Required 21 credits including:**

<table>
<thead>
<tr>
<th>Course Code</th>
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<tr>
<td>PHIL 338</td>
<td>Christianity</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 356</td>
<td>Islam</td>
<td>3</td>
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Select three of the following:

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<tbody>
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<td>PHIL 104</td>
<td>Religions of the West</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 316</td>
<td>Daoism and Confucianism</td>
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<td>PHIL 320</td>
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</tr>
<tr>
<td>PHIL 380</td>
<td>Buddhism</td>
<td>3</td>
</tr>
</tbody>
</table>

Students may elect any 15 credits in Religious Studies not to include the 6 required credits (PHIL 103 and PHIL 485), the 3 required credits in Western Traditions, and the 3 required credits in Asian Traditions. Students may elect any 9 credits of Philosophy courses.

**Total Credits** 36

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### Courses in Religious Studies

Religious Studies Concentration Requirements (36 credit hours):

<table>
<thead>
<tr>
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<th>Course Name</th>
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</tr>
</thead>
<tbody>
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<td>3</td>
</tr>
<tr>
<td>PHIL 253</td>
<td>Environmental Ethics</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 312</td>
<td>American Philosophy</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 315</td>
<td>Philosophy of Race &amp; Postcolonialism</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 331</td>
<td>Contemporary European Philosophy</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 342</td>
<td>Advanced Ethics</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 355</td>
<td>Social and Political Philosophy</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 380</td>
<td>Feminist Philosophy</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 450</td>
<td>Philosophy, Economics, and Politics</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 451</td>
<td>Current Topics in Political Philosophy</td>
<td>3</td>
</tr>
</tbody>
</table>

Electives: 6

Any additional 6 credits in Philosophy or Religious Studies

**Total Credits** 36

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### Bachelor of Arts with Major in Philosophy and Religion: Religious Studies Concentration

Required 120 credits (36 of which must be numbered 300 or above, and 30 of which must be from UND) including:

I. Essential Studies Requirements (see University ES listing).

II. Religious Studies Concentration Requirements (36 credit hours):

<table>
<thead>
<tr>
<th>Course Code</th>
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<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHIL 103</td>
<td>Introduction to Religious Studies</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 485</td>
<td>Seminar in Theory and Method</td>
<td>3</td>
</tr>
</tbody>
</table>

Select one of the following (Western Traditions):

<table>
<thead>
<tr>
<th>Course Code</th>
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</tr>
</thead>
<tbody>
<tr>
<td>PHIL 104</td>
<td>Religions of the West</td>
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</tr>
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</tr>
<tr>
<td>PHIL 356</td>
<td>Islam</td>
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</tbody>
</table>

Select one of the following (Asian Traditions):

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
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</tr>
</thead>
<tbody>
<tr>
<td>PHIL 105</td>
<td>Religions of Asia</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 316</td>
<td>Daoism and Confucianism</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 320</td>
<td>Hinduism</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 380</td>
<td>Buddhism</td>
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</tbody>
</table>

Students may elect any 15 credits in Religious Studies not to include the 6 required credits (PHIL 103 and PHIL 485), the 3 required credits in Western Traditions, and the 3 required credits in Asian Traditions. Students may elect any 9 credits of Philosophy courses.

**Total Credits** 36
Physical Therapy (PT)

Courses

PT 101. Orientation Physical Therapy. 1 Credit.
Overview of the educational requirements, practice issues, and opportunities in the profession of physical therapy. Course content includes multimedia presentations, lectures, and observation in clinical settings.

PT 402. Professional Communication and Behavior. 2 Credits.
Lecture and practice in interprofessional and interpersonal communication including professional behavior, ethics, patient education, and written documentation. Prerequisite: Registered in Professional Physical Therapy Curriculum.

PT 409. Clinical Pathology I. 3 Credits.
Selected pathological conditions affecting the musculoskeletal system. Associated orthopedic diagnoses, surgical interventions, the influences of co-morbidities and pharmaceutical interventions, and safety concerns are discussed with an application to physical therapy patient/client management during orthopedic rehabilitation. Laboratory. Prerequisite: Registered in Professional Physical Therapy Curriculum. S.

PT 410. Clinical Pathology II. 3 Credits.
Selected pathological conditions of body systems, associated surgical interventions, the influence of co-morbidities, pharmaceutical interventions, and safety concerns are discussed with application to physical therapy patient/client management. Laboratory. Prerequisite: Registered in Professional Physical Therapy Curriculum. S.

PT 412. Biomechanics and Kinesiology. 4 Credits.
Biomechanics and kinesiology of musculature acting on the extremities and trunk. Clinical applications and evaluation of joint integrity and mobility, gait, range of motion and muscle performance. Laboratory. Prerequisite: Registered in Professional Physical Therapy Curriculum. S.

PT 413. Exercise in Health and Disease. 3 Credits.
Basic foundation for theoretical and practical application of exercise science principles for physical therapists. Exercise science principles are applied to healthy individuals and individuals with disease, impairments, and/or functional limitations. Examination and intervention procedures incorporate aerobic capacity/endurance, anthropometric characteristics, and muscle performance activities. Laboratory. Prerequisite: Registered in Professional Physical Therapy Curriculum. S.

PT 415. Motor Control. 3 Credits.
Lecture and laboratory work in therapeutic exercise to establish and maintain muscular control and coordination, including muscle re-education, facilitation, and relaxation. Laboratory. Prerequisite: Registered in Professional Physical Therapy Curriculum.

PT 417. Clinical Exam and Evaluation I. 4 Credits.
Emphasizes patient/client management elements of examination and evaluation. Emphasis is given to the musculoskeletal and neurological systems. Laboratory. Prerequisite: Registered in Professional Physical Therapy Curriculum.

PT 420. Musculoskeletal System Examination. 2 Credits.
Principles of musculoskeletal examination and evaluation including identification and palpation of surface anatomy, range of motion (ROM), measurement of joint ROM, and evaluation of muscle performance. Laboratory. Prerequisite: Registered in Professional Physical Therapy Curriculum. F.

PT 422. Anatomy for Physical Therapy. 5 Credits.
Detailed lectures and demonstrations on musculoskeletal anatomy and neuroanatomy. Laboratory. Prerequisite: Registered in Professional Physical Therapy Curriculum.

PT 423. Neuroscience for Physical Therapy. 4 Credits.
Structure and function of the human nervous system including pathophysiology and clinical applications relevant to physical therapy practice. Prerequisite: Registered in Professional Physical Therapy Curriculum.

PT 426. Manual Therapy I. 2 Credits.
Introduction to joint mobilization/manipulation techniques. Emphasis is on mobilization/manipulation as it relates to peripheral joints and soft tissues of the human body. Basic examination, evaluation, and intervention techniques for the spine are also presented. Laboratory. Prerequisite: Registered in Professional Physical Therapy Curriculum. S.

PT 435. Introduction to Patient/Client Care and Interventions. 4 Credits.
Basic physical therapy patient care skills addressing multiple areas of physical therapy practice. A sample of topics address injury to the integument, select interventions for all patients, positioning of patients, vital signs, aseptic technique, and basic wheelchair techniques. Laboratory. Prerequisite: Registered in professional physical therapy curriculum. F.

PT 490. Special Topics: Physical Therapy. 1-4 Credits.
Introduction and investigation of advanced clinical procedures and topics. Topics discussed will be dictated by student and faculty interests. Prerequisite: Registered in Professional Physical Therapy Curriculum. Repeatable to 4 credits.

PT 491. Independent Study. 1-4 Credits.
Research and independent study in a specialized area of Physical Therapy. Prerequisite: Registered in Professional Physical Therapy Curriculum.

Physics and Astrophysics (Phys)

B.S. with Major in Physics (p. 189)
B.S./M.S. with Major in Physics (p. 189)
Minor in Physics (p. 190)
Minor in Astrophysics (p. 190)

Courses

PHYS 101. Survey of Physics & Astrophysics. 1 Credit.
A survey of a broad range of topics in physics ranging from nanoscience to astrophysics and physics-related educational and career opportunities. Intended to help physics majors and students interested in majoring in physics make informed academic decisions early in their college life. S/U grading. F.

PHYS 110. Introductory Astronomy. 3 Credits.
An introductory study of the universe: The solar system, stars, stellar evolution, galaxies, black holes, big bang cosmology, and the accelerating universe. The astronomy laboratory 110L is optional for 1 credit. F.S.

PHYS 110L. Introductory Astronomy Lab. 1 Credit.
An introductory study of the universe: The solar system, stars, stellar evolution, galaxies, black holes, big bang cosmology, and the accelerating universe. The astronomy laboratory 110L is optional. F.S.

PHYS 130. Natural Science-Physics. 4 Credits.
For non-science majors, this is a hands-on, inquiry-based course on the workings of science. Emphasis is on critical thinking and the use of the scientific method. Topics will include: electricity, force, motion, and energy. The laboratory is a component of this course. S.

PHYS 140. Physics for Poets. 3 Credits.
An introduction to the fundamental concepts of physics, especially those developed in the twentieth century. A knowledge of elementary algebra is recommended, but the course is designed for students with a limited mathematical background. No laboratory. On demand.

PHYS 150. Physics for Aerospace Sciences. 5 Credits.
An introduction to the principles and concepts of physics as they apply to the study of aerospace sciences. Topics: Newtonian mechanics, gravitation, work, energy, fluids, electricity, magnetism. F.S.

PHYS 161. Introductory College Physics I. 4 Credits.
An introduction to the principles and concepts of physics with the application of minimal mathematics, sufficient to show the logical progression from one topic to the next. General physics for those who do not plan to take an advanced course in science. Topics: Newtonian mechanics and gravitation, work and energy, solids and fluids, vibrations and waves, electricity and magnetism, light and optics. The laboratory is a component of this course. No mathematical prerequisite is required, but knowledge of elementary algebra is recommended. F.

PHYS 162. Introductory College Physics II. 4 Credits.
An introduction to the principles and concepts of physics with the application of minimal mathematics, sufficient to show the logical progression from one topic to the next. General physics for those who do not plan to take an advanced course in science. Topics: Newtonian mechanics and gravitation, work and energy, solids and fluids, vibrations and waves, electricity and magnetism, light and optics. The laboratory is a component of this course. Prerequisite: PHYS 161. S.
PHYS 211. College Physics I. 4 Credits.
This non-calculus general physics course is recommended for pre-medical or
pre-professional students. Topics: Newtonian mechanics and gravitation, work
and energy, solids and fluids, heat and thermodynamics. The laboratory is a
component of this course. A student may not receive credit for PHYS 211 and
PHYS 212, and also PHYS 161 and PHYS 162. Prerequisite: MATH 103. F.

PHYS 211C. College Physics I. 3 Credits.
This non-calculus general physics course is recommended for pre-medical or
pre-professional students. Topics: Newtonian mechanics and gravitation, work
and energy, solids and fluids, heat and thermodynamics. Students requiring a
laboratory must take PHYS 211CL. Prerequisite: MATH 103. F.

PHYS 211CL. College Physics I Laboratory. 1 Credit.
The laboratory part of Physics 211C. Prerequisite: PHYS 211C or consent of
instructor. S/U grading. SS.

PHYS 212. College Physics II. 4 Credits.
The non-calculus general physics course sequence recommended for pre-
medical or pre-professional students. Topics: vibrations and waves, electricity
and magnetism, light and optics, and an introduction to modern physics. The
laboratory is a corequisite for this course. The laboratory is a component of this
course. A student may not receive credit for PHYS 211 and PHYS 212, and
also PHYS 161 and PHYS 162. Prerequisite: PHYS 211. S.

PHYS 212C. College Physics II. 3 Credits.
The non-calculus general physics course sequence recommended for pre-
medical or pre-professional students. Topics: vibrations and waves, electricity
and magnetism, light and optics, and an introduction to modern physics. Students requiring a
laboratory with this course must take PHYS 212CL. Prerequisite: PHYS 211C or PHYS 211. S.

PHYS 212CL. College Physics II Laboratory. 1 Credit.
The laboratory part of Physics 212C. Prerequisite: PHYS 212C or consent of
instructor. S/U grading. SS.

PHYS 213. College Physics III. 4 Credits.
A survey of modern physics covering physical optics, special theory of relativity,
quantum theory, atomic physics, molecular and solid state physics, nuclear
physics and radioactivity, particle physics, and astrophysics. The laboratory is a
component of this course. Prerequisite: PHYS 212. F.

PHYS 251. University Physics I. 4 Credits.
The university physics sequence is for students majoring in science and
engineering. Topics normally covered in PHYS 251 include Newtonian
mechanics and gravitation, work and energy, rotational dynamics, vibrations
and waves, mechanics of solids and fluids, basic kinetic theory, equations of
state and the first and second laws of thermodynamics. The laboratory is a
component of this course. Prerequisite: MATH 165. F,S.

PHYS 252. University Physics II. 4 Credits.
Topics normally covered include electricity, magnetism, electromagnetic waves,
light and geometrical optics. The laboratory is a component of this course.
Prerequisites: MATH 166 and PHYS 251. F,S.

PHYS 253. University Physics III. 4 Credits.
Modern physics, a survey covering physics of the 20th and 21st centuries.
Topics normally covered include theory of relativity, discovery of quantum
phenomena, basic quantum mechanics, overview of atomic, nuclear and
solid state physics, statistical physics, quantum fluids and superconductivity,
fundamental forces and the physics of elementary particles. This course is a
prerequisite for most courses in advanced physics. The laboratory is a
component of this course. Prerequisites: PHYS 253 or approval of department. S.

PHYS 294. Selected Topics. 1-4 Credits.
Prerequisite: 8 hours of college physics or consent of instructor. Repeatable to
4 credits. On demand.

PHYS 317. Mechanics I. 3 Credits.
Motion of a simple particle, central forces and simple oscillatory systems.
Prerequisites: PHYS 251 and MATH 266, or approval of department. F.

PHYS 318. Mechanics II. 3 Credits.
Rigid body motion, Lagrangian and Hamiltonian dynamics, relativity, continuum
mechanics. Prerequisite: PHYS 317 or approval of instructor. SS.

PHYS 320. Introduction to Materials Science. 3 Credits.
An introduction to solid state physics with emphasis on applications.
Prerequisite: PHYS 253 or approval of department. F.

PHYS 324. Thermal Physics. 3 Credits.
Thermodynamics with an introduction to statistical physics. Prerequisite:
PHYS 253 or approval of instructor. S, even years.

PHYS 325. Optics. 3 Credits.
Geometrical and physical optics with an emphasis on physical optics.
Prerequisite: PHYS 253 or approval of department. S.

PHYS 325L. Optics Laboratory. 1 Credit.
Laboratory to accompany Physics 325. Corequisite: PHYS 325. S.

PHYS 327. Electricity and Magnetism I. 3 Credits.
A quantitative treatment of electromagnetic theory with an introduction to
Maxwell's equations. Prerequisite: PHYS 253 or approval of instructor. F.

PHYS 328. Electricity and Magnetism II. 3 Credits.
Maxwell's equations. The scalar potential as a solution of a boundary value
problem. The vector potential and its application. A quantitative treatment of
dielectrics, magnetic materials and electromagnetic radiation. Prerequisite:
PHYS 257. Corequisite: MATH 352 or approval of instructor. S, even years.

PHYS 402. Computers in Physics. 3 Credits.
Computer applications in physics, that may include data analysis, numerical
simulation, symbolic and algebraic programming, parallel computing, computer
interfacing and/or experimental physics applications. Prerequisites: PHYS 252
and knowledge of a higher-level computer programming language, or consent
of instructor. On demand.

PHYS 415. Undergrad Research Experience. 3 Credits.
The students will engage in research activities of a UND physics faculty
member or may take part in a physics department approved external research
program such as an NSF-funded REU program. Prerequisite: PHYS 253 or
advisor's consent.

PHYS 420. Advanced Topics in Materials Science. 3 Credits.
The application of physics to design, synthesis and characterization of
materials of current interest. Prerequisite: PHYS 320. S, odd years.

PHYS 428. Advanced Physics Laboratory. 2 Credits.
Advanced undergraduate experiments in physics, using modern techniques
and instrumentation. Classic experiments leading to the current understanding
of physical theory. Prerequisite: PHYS 253 or approval of instructor. F.

PHYS 431. Quantum Mechanics I. 3 Credits.
An introduction to quantum mechanics with applications to atomic structure.
Prerequisite: PHYS 253. Prerequisite or Corequisite: PHYS 317 or approval of
department. F.

PHYS 432. Quantum Mechanics II. 3 Credits.
Further development of basic quantum theory with application to atomic,
molecular, solid state and nuclear physics. Prerequisite or Corequisite:
PHYS 431 or consent of instructor. S, odd years.

PHYS 434. Nuclear Physics. 3 Credits.
Introduction to the theory of atomic nuclei, fundamental forces and sub-atomic
particles. Prerequisite: PHYS 253 or approval of instructor. F.

PHYS 437. Introductory Solid State Physics. 3 Credits.
A general introduction to solid state phenomena. Prerequisite: PHYS 253 or
approval of instructor. F.

PHYS 460. Introduction to Astrophysics. 3 Credits.
Nature of stars. Topics include celestial mechanics, relativity, optics, stellar
birth, stellar interiors and evolution, nucleosynthesis, stellar death, compact
objects, black holes, neutron stars, white dwarfs, binaries and variable stars.
Some topics include the use of computer tools to solve problems. Prerequisite:
PHYS 253 or approval of instructor. F.

PHYS 461. Introduction to Astrophysics II. 3 Credits.
Galaxies and the universe. Topics include structure and evolution of galaxies,
the Milky Way, stellar populations, globular clusters, interstellar medium, big
bang, Hubble and the distance scale, radio galaxies, quasars, jets, blazars,
clusters and superclusters of galaxies and cosmology. Some topics include the
use of computer tools to solve problems. Prerequisite: PHYS 460 or approval of
instructor. S, odd years.

PHYS 489. Senior Honors Thesis. 1-15 Credits.
Prerequisite: Approval of the department. Repeatable to 9 credits. On demand.

PHYS 492. Special Problems. 1-3 Credits.
Selected problems in physics or astrophysics. Prerequisite: Approval of the
department. Repeatable to 9 credits. On demand.
Bachelor of Science with Major in Physics

Required 120 credits (36 of which must be numbered 300 or above, and 30 of which must be from UND) including:

I. Essential Studies Requirements (see University ES guidelines and course listings).

II. The Following Curriculum:

Each track leads to a Bachelor of Science with Major in Physics, awarded through the College of Arts and Sciences. A total of 120 credits is required for graduation. In addition to other University Graduation Requirements and the courses specified for one of the five options listed below, all Physics majors must complete successfully the following set of core courses:

- PHYS 251 University Physics I 4
- PHYS 252 University Physics II 4
- PHYS 253 University Physics III 4
- PHYS 317 Mechanics I 6
- PHYS 318 and Mechanics II 3
- PHYS 324 Thermal Physics 3
- PHYS 325 Optics 3
- PHYS 325L Optics Laboratory 1
- PHYS 327 Electricity and Magnetism I 6
- PHYS 328 and Electricity and Magnetism II 3
- PHYS 415 Undergrad Research Experience 3
- PHYS 428 Advanced Physics Laboratory 2
- PHYS 431 Quantum Mechanics I 6
- PHYS 432 and Quantum Mechanics II 3
- CHEM 121 General Chemistry I 6
- CHEM 122 and General Chemistry II 3
- CHEM 121L General Chemistry I Laboratory 2
- CHEM 122L and General Chemistry II Laboratory 3
- MATH 165 Calculus I 12
- MATH 166 and Calculus II 3
- MATH 265 and Calculus III 3
- MATH 266 Elementary Differential Equations 3
- MATH 352 Introduction to Partial Differential Equations 3
- MATH 207 Introduction to Linear Algebra 2

Total Credits 70

To provide proper advisement, the Department of Physics and Astrophysics requires its majors to meet with their physics adviser prior to registration each semester. This ensures each student is enrolled in appropriate classes and helps the department schedule certain courses in a timely manner. A hold is placed on registration for physics majors until this advisement session takes place. It is the student’s responsibility to schedule the advisement session.

Beyond completion of the core listed above and the general education requirements, all physics majors must complete one of the following options together with additional electives for a total of 120 credits.

I. General Physics option: This is a general physics degree offering maximum flexibility. It is appropriate for students who may seek advanced degrees, for instance, or who are interested in medical school. Beyond the core, the student must complete an additional 9 credits of Physics numbered above 300. No more than 3 credits of these 9 may be in PHYS 402 Special Problems.

II. Applied Physics track: This choice will provide interdisciplinary training in applied physics and applied electronics with emphasis on instrumentation and measurement technique. The purpose is to prepare the student to work as part of a research team in an industrial, government or academic setting. In addition to the core, the student must complete:

- EE 206 Circuit Analysis 3
- EE 206L Circuits Laboratory I 1
- EE 313 Linear Electric Circuits 3
- EE 313L Circuits Laboratory II 1

EE 321 Electronics I 3
EE 321L Electronics Laboratory I 1
PHYS 402 Computers in Physics 3

Total Credits 15

In addition, students electing the applied physics track should select an instrumentation project as a means of satisfying the research core requirement, PHYS 415 Undergrad Research Experience.

III. Astrophysics track: This option is for students with special interest in astronomy, astrophysics, space exploration or aerospace applications. The following are required.

- PHYS 110 Introductory Astronomy 3
- PHYS 110L Introductory Astronomy Lab 1
- PHYS 434 Nuclear Physics 3
- PHYS 460 Introduction to Astrophysics 3
- PHYS 461 Introduction to Astrophysics II 3

Total Credits 13

To satisfy the research requirement, PHYS 415 Undergrad Research Experience, students in the astrophysics track should select an approved astrophysics project.

IV. Computers in Physics track: This choice provides extensive experience using computers for running experiments, analyzing data, doing computer simulations and calculations in physics. The student should be prepared to learn programming languages. The following are required.

- CSCI 160 Computer Science I 4
- CSCI 161 Computer Science II 4
- PHYS 402 Computers in Physics 3

Total Credits 11

For the Computers in Physics track, students should seek out computational research projects for PHYS 415 Undergrad Research Experience, or laboratory projects involving computer instrumentation.

V. Materials Science track: This option provides the strongest foundation in solid state and materials science. Required are:

- PHYS 320 Introduction to Materials Science 3
- PHYS 420 Advanced Topics in Materials Science 3
- PHYS 437 Introductory Solid State Physics 3

Total Credits 9

Students in this track should select approved research projects in materials science as a means of satisfying the PHYS 415 Undergrad Research Experience requirement.

Five-Year Bachelor of Science-Master of Science Degree Program in Physics

The program will use only the existing courses in the Department of Physics and Astrophysics, Department of Mathematics, and Department of Chemistry.

The program course requirements include the following courses:

- PHYS 251 University Physics I 4
- PHYS 252 University Physics II 4
- PHYS 253 University Physics III 4
- PHYS 317 Mechanics I 3
- PHYS 318 Mechanics II 3
- PHYS 324 Thermal Physics 3
- PHYS 325 Optics 3
- PHYS 325L Optics Laboratory 1

Total Credits 189

University of North Dakota
Minor in Astrophysics

A minor in astrophysics is offered for students who are interested in an understanding of the astrophysics of stars, galaxies, and the universe. The astrophysics minor cannot be combined with a major or minor in physics.

Required 25 credits, including:

- PHYS 10: Introductory Astronomy 3 credits
- PHYS 110L: Introductory Astronomy Lab 1 credit
- PHYS 211: College Physics I and PHYS 211L 4 credits
- PHYS 212: College Physics II and PHYS 212L 4 credits
- PHYS 213: College Physics III and PHYS 213L 4 credits
  - or PHYS 251 and PHYS 251L 3 credits
- PHYS 252: University Physics II and PHYS 252L 4 credits
- PHYS 253: University Physics III and PHYS 253L 4 credits
- PHYS 460: Introduction to Astrophysics 3 credits
- PHYS 461: Introduction to Astrophysics II 3 credits
- Select one of the following:
  - PHYS 415: Undergrad Research Experience 3 credits
  - PHYS 434: Nuclear Physics 3 credits
  - SPST 425: Observational Astronomy 3 credits

Total Credits: 92-107

Minor in Physics

Required 20 credits in Physics. The specific courses should be chosen in consultation with the department.

Political Science (Pols)

B.A. in Political Science (p. 192)

B.A. in Political Science: 3+3 Year Plan (Law Program) (http://und-public.coursesleaf.com/undergraduateacademicinformation/departamentalcoursesprograms/politicalscience/pols-law)

Minor in Political Science (p. 192)

Courses

POLs 115. American Government I. 3 credits.
An introduction to political science through the study of the American political system: The Constitution; the political processes; the structure, powers and procedures of the Presidency, Congress, and the Judiciary. F.S.

POLs 116. State and Local Government. 3 credits.
Structure, function and problems of state and local government; executive, legislative, and judicial processes; federalism and metropolitan government. F.S.

POLs 120. Global Perspectives. 3 credits.
This course is designed to help students think critically about global awareness, diversity, and multiculturalism. This course will provide a foundation for students to later complete a designated global engagement experience. The course explores globalization and its consequences and builds a foundation for students to be informed and globally engaged citizens. F.

POLs 200. Introduction to the Nonprofit Sector. 3 credits.
Historically, nonprofit institutions have filled the gaps in commerce left by government and the for-profit organizations, with the intention of serving populations with special needs. The range of nonprofit services are far reaching, serving groups with diverse public purpose such as charitable organizations, religious institutions, museums, professional associations, and philanthropic foundations. This course will introduce and examine how nonprofits operate, the various roles they play on the local, national, and international levels, and the structures and processes of organizational governance. The course will utilize readings, class discussion, and written assignments to expand awareness of the scope and number of nonprofits in the US, examine the inner working of the nonprofit sector, and give the student a foundation for further study of these topics. The College of Arts and Sciences is deleting the course from their curriculum independently of this action. F.S.

POLs 215. Politics and Diversity. 3 credits.
Diversity is considered with the context of the American political system. Students will explore the cultural basis of group identity and how this translates into political engagement. The implications of group political participation will be considered in terms of competing models of democracy as well as the impact collective action has had on public policy. S.

POLs 220. International Politics. 3 credits.
An introduction to international politics with emphasis on the international system, the major actors, the struggle for power, and the struggle for order. S.

POLs 225. Comparative Politics. 3 credits.
An introduction to comparative politics with emphasis on the democratic systems of Europe. F.

POLs 250. Introduction to Public Administration. 3 credits.
Introduction to the development of public administration in the United States and to the concepts and methods used in its practice. The political aspects of the public bureaucracy and contemporary issues are also highlighted. Prerequisite: POLS 115. F.

POLs 300. Introduction Research Methods. 3 credits.
General consideration of research methods and data analysis in political science and the social sciences. F.

POLs 305. American Constitution-Governmental Powers. 3 credits.
American Constitution studied in light of U.S. Supreme Court decisions and interpretations; focus on government powers, federal relationships, and economic regulation. F.

POLs 306. American Constitution-Civil Liberties. 3 credits.
Analyzes U.S. Supreme Court decisions and interpretations which focus on civil liberties; equal protections, due process, First Amendment rights. Prerequisite: POLS 115. S.

POLs 308. Intergovernmental Relations. 3 credits.
Analyzes the growing interrelationship of federal, state and local governments with emphasis on financial aspects.
POL 310. Introduction to Political Thought. 3 Credits.
Political thought from classical times to the 19th century with emphasis on issues raised in the works of Plato, Aristotle, St. Agustine, Machiavelli, Hobbes, Locke, Rousseau, Mill, Marx and Nietzsche. F.

POL 318. American Political Thought. 3 Credits.
A historical analysis of the major thinkers and of the streams of thought which molded the political life and institutions of the United States from the Puritans to the present. F.

POL 320. Foreign Policies. 3 Credits.
Examination of the roles of major powers in the international system, with emphasis on the foreign policies of the United States and other major powers. S.

POL 321. International Human Rights. 3 Credits.
Examination of factors that contribute to human rights violations and domestic, multilateral and bilateral efforts to combat such violations with emphasis placed on the changing nature of the international system of states.

POL 322. Internal Conflict and Political Stability. 3 Credits.
Examination of the internal challenges to the political stability of states, including a diverse range of topics such as the causes of civil war, ethnic violence, and terrorism. Other topics include insurgency and counter insurgency and the role of the international community in stabilizing internal conflicts through intervention, peacekeeping, and mediation. F, even years.

POL 324. Chinese Politics. 3 Credits.
The course evaluates the politics of China following two underlying themes: assessing the changes that have taken place in China since the death of Mao and China’s place of prominence on the global stage. Focus is placed on Chinese politics since the economic reforms in the 1970s and the political implications of these reforms. The course also evaluates Chinese public policy with regard to critical issues facing China today. S, odd years.

POL 325. Politics of the Modern Middle East. 3 Credits.
The Middle East and North Africa are crucial areas to the world’s economy and security. The mere threat of disrupted shipping lanes between the Persian Gulf and the world is sufficient to spark discussions of a war between global and regional powers. Western governments have been dealing with a rise in global terror incidents originating from this region since the mid-1900s from both secular and religious organizations. Despite recent efforts to focus American foreign policy towards the Pacific Rim, the Middle East continues to draw U.S. resources and attention. Islamic State of Iraq and Syria (ISIS/ISIL) attacks on western targets and interests have re-embroidered the Western military forces into the region in the past few years. It is therefore critical that students interested in international relations, policy, or security understand this tumultuous region.

Comprehending the Middle East and North Africa’s political history is pivotal for comprehending the myriad of forces that drive current actors in the region. To that end, we will focus on the comparative politics of different Middle Eastern states and how outcomes differed from state to state in the region. The ultimate goal, though, is to understand how the people of the Middle East and North Africa have understood, developed, and rejected their national identities. This course does not require students possess prior knowledge of the Arab World or a formal background in political science theory. Students of all backgrounds interested in the region are welcome and encouraged to attend. The course hints at theories within comparative politics, such as rational choice theory, institutionalism and path dependency, political culture, and modernization theory. However, the frequency of regime change events in the Middle East will require students to learn about theories of social transformation (e.g. revolution) in this course, albeit in a less strict manner than formal theoretical courses.

Given the sheer size of the Middle East and its history, this course will be taught through thematic vehicles using case examples rather than requiring the memorization of each individual country’s political trajectory. On demand.

POL 326. Terrorism and Its Context. 3 Credits.
This is a class about spectacular political violence and its societal context. We will deal with classic debates in terrorism such as “is there a meaningful distinction between an insurgency and a terrorist campaign?”; “does ideology motivate people in the absence of other motivating factors to commit terror attacks?”, and “what is terrorism?” From the FLN in Algeria to the LTTE in Sri Lanka, this class will span the world and provide you with a global perspective on international terror with French-speaking Maghreb Arab insurgencies and violent Buddhist movements. We will discuss the social psychology of martyrdom, resistance movements, political institutionalization, and the difference between military and political solutions to terror campaigns. The fundamental teaching mechanism for this class is discussion and critical thinking. With every reading, you should be asking yourself: “do I find this compelling? If so, why? Is there something that the author is omitting (a case example or implication from his or her argument) that could strengthen his or her argument?” Similarly, when you find an article unconvincing, you need to ask yourself “why do I find this unconvincing? Is there some implication to the argument that is unconvincing? Is there something the author is omitting (a case example or implication from his or her argument) that weakens his or her argument?” It is not sufficient to have a feeling about something. You need to have a rationale and you need to defend that rationale. At the same time, you should read texts charitably. On demand.

POL 328. Legislative Processes. 3 Credits.
Emphasis will be placed on the structure, functions, and duties of Congress, as well as congressional elections, patterns of congressional leadership, policy successes and failures, and the relationship between Congress and the federal courts and Congress and the U.S. Presidency. S, even years.

POL 329. Presidential Institutions and Management. 3 Credits.
This course focuses on the intersection of politics and management with the executive branch. Special emphasis is placed on the roles of institutions and critical executive branch actors such as the President in the management and execution of public policy. S, odd years.

POL 331. Women and Politics. 3 Credits.
Role of women in politics, including selection of women for political offices, the political attitudes and behavior of women; and the development of public policy initiatives as they affect or are likely to affect women. S, SS.

POL 332. Urban Politics and Administration. 3 Credits.
Analysis of the socio-economic context of urban America and its impact on politics, policy, and administration. Prerequisite: POLS 115. F.

POL 333. Cooperative Education. 1-2 Credits.
Compensated on-the-job experience in various areas of political science. Prerequisites: GPA of 3.0, 12 hours in POLS, course related to cooperative experience, and permission of department. Repeatable to 6 credits. S/U grading. On demand.

POL 334. Nonprofit Management (Undergrad). 3 Credits.
This course is an overview of the management of nonprofit organizations. Content includes the history and legal foundation of nonprofits, leadership, management, marketing, management of employees and volunteers, and operations management. F, even years.

POL 335. Problems in Political Science. 1-3 Credits.
Students study special topics under the direction and supervision of a member of the faculty. Repeatable when topics vary. Repeatable to 9 credits. On demand.

POL 336. Political Behavior. 3 Credits.
Analysis of the socio-economic context of urban America and its impact on politics, policy, and administration. Prerequisite: POLS 115. S.

POL 337. Political Behavior. 3 Credits.
A review of the role of the public in a democracy focusing on the formation and content of public opinion, the means of communicating that opinion to government, and the impact of that opinion on policy. Prerequisite: POLS 115. F.

POL 338. Social Policy. 3 Credits.
This course will focus on the development of social policy in the United States. Particular emphasis will be placed on the role of government and the role of the public in the policy-making process. Prerequisite: POLS 115. F.

POL 339. Policy Making in Political Science. 3 Credits.
This course is an introduction to the study of public policy. Emphasis will be placed on the process of policy making, the role of the public in the policy making process, and the impact of policy on society. Prerequisite: POLS 115. F.

POL 340. Political Science and Public Policy. 3 Credits.
This course is an introduction to the study of public policy. Emphasis will be placed on the process of policy making, the role of the public in the policy making process, and the impact of policy on society. Prerequisite: POLS 115. F.

POL 341. Political Science and Public Policy. 3 Credits.
This course is an introduction to the study of public policy. Emphasis will be placed on the process of policy making, the role of the public in the policy making process, and the impact of policy on society. Prerequisite: POLS 115. F.

POL 342. Public Policy Making Process. 3 Credits.
Two-thirds of this class is devoted to understanding the stages of the policy process: (1) Problem Identification and Agenda Setting; (2) Policy Formulation; (3) Policy Adoption; (4) Policy Implementation; and (5) Policy Evaluation. The last third applies the model to substantive policy areas such as health, environment, education. Prerequisite: POLS 115. S.

POL 343. Administrative Processes. 3 Credits.
Explanation of theoretical and practical aspects of personnel and financial management in the public sector. F, even years.
POLS 450. Capstone Experience and Development. 3 Credits.
The capstone experience and development is intended to serve as a culminating experience in the Nonprofit Leadership Program. The course encourages students to draw on courses and co-curricular experiences throughout the curriculum to create and develop a portfolio. This course will prepare students to use skills they have developed through the program to develop a community project that addresses social issues within our community. At the conclusion of this course, students with have demonstrated skills commensurate with the core competencies and developed a level of knowledge necessary for effectively managing a nonprofit organization as a competent leader. Prerequisite: POLS 200. S.

POLS 480. Administrative Internship. 1-3 Credits.
On-the-job training in a governmental or non-profit organization position with final report and analysis of the agency by the intern. Prior approval of instructor required before enrollment. Prerequisites: GPA of 3.0, 12 hours in POLS, course related to cooperative experience, and permission of department. Repeatable to 3 credits. S/U grading. On demand.

POLS 489. Senior Honors Thesis. 1-15 Credits.
POLS 491. Readings in Political Science. 1-3 Credits.
Selected readings with oral and written reports. Consent of instructor required prior to enrollment. Prerequisites: GPA of 3.0 or higher, 12 hours in POLS, course related to readings, and consent of department. F.S.

POLS 493. Professional Project Public Administration. 1-6 Credits.
An independent study where students will independently develop a paper under supervision, which demonstrates the ability to use the knowledge and skills of public administration to address public administration issues. Prerequisite: Senior standing. S.

POLS 495. Senior Colloquium in Political Science and Public Administration. 3 Credits.
A capstone course in Political Science designed to integrate the subareas of the discipline. The development of the discipline, its great thinkers, and current directions will be examined. This course is designed for majors only. Prerequisite: Senior standing and 21 hours of POLS credit or consent of the instructor. S.

POLS 497. Senior Tutorial. 2 Credits.
A course which requires mentoring introductory students in Political Science. Further, students will undertake supervised independent research culminating in a major paper. Prerequisite: Senior standing or consent of instructor. Corequisites: POLS 432 and POLS 495. S.

Bachelor of Arts in Political Science

Required 120 credits (36 of which must be numbered 300 or above) including:

I. Essential Studies Requirements (see University ES listing).

II. BA in Political Science Program Requirements:

a. At least a 2.50 GPA overall

b. At least a 2.50 GPA for courses required within the major

III. Core Curriculum:

Introductory-level coursework
Select two of the following:
- POLS 115 American Government I (3)
- POLS 116 State and Local Government (3)
- POLS 120 Global Perspectives (3)

Intermediate-level coursework
Select two of the following:
- POLS 215 Politics and Diversity (3)
- POLS 220 International Politics (3)
- POLS 225 Comparative Politics (3)
- POLS 250 Introduction to Public Administration (3)

Advanced-level coursework
- POLS 300 Introduction Research Methods (3)
- POLS 310 Introduction to Political Thought (3)
- POLS 405 Political Behavior (3)
- POLS 432 Public Policy Making Process (3)

A Capstone experience

POLS 495 Senior Colloquium in Political Science and Public Administration (3)

Political Science students also will take 9 hours of electives, normally at the 300-level or above. Up to three (3) credits at the 200-level may be counted towards this elective requirement without prior departmental approval. Majors may take up to six (6) hours of these electives, at the 300-level or above from relevant courses outside the department with prior departmental approval.

Total Credits 54

Students may substitute POLS 308 Intergovernmental Relations with departmental approval.

Political Science students also will meet the following requirements based on courses offered in other departments:

1. Level II proficiency in a foreign language
2. ECON 202 Principles of Macroeconomics or equivalent (3 credits)
3. ECON 210 Introduction to Business and Economic Statistics or equivalent undergraduate statistics course such as PSYC 241 Introduction to Statistics or SOC 326 Sociological Statistics

Minor in Political Science

Students who minor in political science will complete 21 hours of coursework, including 15 hours of Core courses and at least 6 hours of electives. The minor’s Core normally will include the following courses:

Introductory-level coursework
Select one of the following:
- POLS 115 American Government I (3)
- POLS 120 Global Perspectives (3)

Intermediate-level coursework
Select two of the following:
- POLS 220 International Politics (3)
- POLS 225 Comparative Politics (3)
- POLS 250 Introduction to Public Administration (3)

Advanced-level coursework
Select two of the following:
- POLS 300 Introduction Research Methods (3)
- POLS 310 Introduction to Political Thought (3)
- POLS 318 American Political Thought (3)
- POLS 305 American Constitution-Governmental Powers (3)
- POLS 306 American Constitution-Civil Liberties (3)
- POLS 405 Political Behavior (3)

Electives (intermediate level or above) (6)

Total Credits 24

Psychology (Psyc)

B.A./B.S. with Major in Psychology (p. 194)

Minor in Psychology (p. 195)

Certificate in Behavioral Health (p. 195)

Certificate in Cyberpsychology (p. 195)

Certificate in Forensic Psychology (p. 195)

PSYC 111 is the prerequisite for all other Psychology courses.
Courses
PSYC 111. Introduction to Psychology. 3 Credits.
A survey of the scientific study of behavior and mental processes, with consideration of the nature and scope of psychology as a science and a profession. F,S.

PSYC 210. Human Sexuality. 3 Credits.
This course provides an overview of human sexuality—covering anatomical and physiological aspects, psychological aspects, behavioral aspects, and social/ cultural aspects. Prerequisite: PSYC 111. S.

PSYC 241. Introduction to Statistics. 4 Credits.
Descriptive and inferential statistics as applied to psychological measurement and experimentation. Prerequisites: PSYC 111 and MATH 103. F,S.

PSYC 250. Developmental Psychology. 4 Credits.
A survey of the psychology of human life span development including intellectual, social, and emotional aspects of the normal individual and emphasizing childhood and adolescent development. Prerequisite: PSYC 111. F,S.

PSYC 270. Abnormal Psychology. 3 Credits.
A survey of the classification, symptoms, and etiology of psychological disorders and behavior pathology. Prerequisite: PSYC 111. F,S.

PSYC 294. Individual Research. 1-4 Credits.
Introductory experience as a research assistant in a research laboratory. A total of 45 hours is typically required over the course of the semester per credit. Prerequisite: Consent of instructor. Repeatable to 4 credits. S/U grading. F,S,SS.

PSYC 299. Special Topics in Psychology. 1-3 Credits.
Repeatable when topics vary. Prerequisite: Consent of instructor. Repeatable. On demand.

PSYC 301. Industrial and Organizational Psychology. 3 Credits.
Selection, training, motivation, leadership, job satisfaction, human engineering and working environments as applied to business and industry. Prerequisites: PSYC 111 and any basic statistics course. F.

PSYC 303. Research Methods in Psychology. 4 Credits.
Survey of research methods; exposure to and evaluation of psychological research; includes an overview of APA format. Prerequisites: MATH 103 or higher and PSYC 111. Prerequisite or Corequisite: PSYC 241. F,S,SS.

PSYC 304. Advanced Research Methods. 3 Credits.
An advanced research methods course. Students will learn how to plan and execute basic psychological experiments, analyze data, and correctly report research findings using APA style. Prerequisite: PSYC 241 and PSYC 303. F,S.

PSYC 313. Educational Psychology. 3 Credits.
The study of educational psychology involves both theory and practice. Focusing upon the principles of psychology and research to the practice of teaching, the ultimate goal is the understanding and improvement of instruction. Prospective teachers and other professionals in training who will interact with students need to understand how students learn and how that learning varies and is affected by each student's context, culture, and development. This course focuses on the effective application of psychological concepts and principles in the learning and instructional processes. Prerequisite: PSYC 111 or permission of the instructor. Prerequisite or Corequisite: PSYC 250 or permission of the instructor. On demand.

PSYC 320. Professional Development & Ethics. 2 Credits.
The purpose of this course is to introduce and to make students familiar with the types of career and advanced degree opportunities that are available upon earning their baccalaureate degree. The course will include exploration of professional undertakings commonly pursued by undergraduate students with a psychology major. Prerequisite: PSYC 303. F,S.

PSYC 330. Biological Bases of Behavior. 4 Credits.
This course will cover the biological bases of psychology in areas of evolution, genetics, the nervous system, and methodology as they pertain to human behavior. Prerequisites: Psychology major and BIOL 111 or BIOL 150 or BIOL 151 or ANAT 204. S.

PSYC 331. Behavior Modification and Therapy. 3 Credits.
Theory and practice in the application of operant and classical conditioning procedures to humans in applied settings. Prerequisite: PSYC 111. S.

PSYC 335. Health Psychology. 3 Credits.
A biopsychosocial approach is used to examine basic concepts, theories, and research in health psychology from the perspectives of the patient, caregiver, health care provider, and researcher. Prerequisite: PSYC 111. F, odd years.

PSYC 355. Adulthood and Aging. 3 Credits.
Basic findings and theoretical issues in the study of human aging from biopsychological and socio-psychological perspectives with an emphasis on the individual. Prerequisites: PSYC 111 plus 3 credits of psychology. F.

PSYC 360. Introduction to Personality. 3 Credits.
Examination of basic concepts in the field of personality. Prerequisite: PSYC 111. F,S.

PSYC 361. Social Psychology. 3 Credits.
Research on individual behavior in its social context: how the individual acts upon the social environment, and interacts with other individuals. Prerequisite or Corequisite: PSYC 111. S.

PSYC 362. Psychology and Law. 3 Credits.
Psychological examination of the legal system, including what psychologists have learned about the law, the many different legal topics psychologists study, and the great promise that psychology holds for improving the legal system. Prerequisite: PSYC 111. F, odd years.

PSYC 365. Psychology of Women. 3 Credits.
Examination of topics relevant to women that are often ignored in traditional psychology courses, such as gender bias in research, gender identity and roles, sexuality and violence. Prerequisite: PSYC 111. S, even years.

PSYC 366. Conflict Management. 3 Credits.
This course provides students with an understanding of conflict, its dynamics, major theoretical explanations, and methods of resolution. Students will also learn some basic conflict resolution skills and processes. Prerequisite: PSYC 111.

PSYC 370. Cyber Security, Big Data, & Human Behavior. 3 Credits.
This course will discuss the connections between human behavior, cyber security and big data. Big data tools and techniques allow the integration of diverse data streams from multiple sources providing the potential for better understanding and prediction of human behavior. Improved predictive modeling emerging from big data has several implications including possibly strengthening the security of critical cyber systems. On demand.

PSYC 372. Behavioral Design & Digital Products. 3 Credits.
Understanding how people learn, think, feel, and behave can help you design technology/machines that are intuitive, appealing, and reduce human operating error! Digital technologies, including autonomous machines such as unmanned/autonomous aerial vehicles and driverless cars, are a fast developing area of technological design and manufacturing. Effective use of these ever-increasingly complex products demands that designers understand and design for how people interact with digital technology. On demand.

PSYC 393. Psychology UGTA Seminar. 1 Credit.
This seminar is a pre-requisite or co-requisite to serving as an undergraduate Teaching Assistant with the Department of Psychology. Completion of the seminar is required for undergraduate students serving as teaching assistants. Prerequisites: Minimum overall GPA of 3.2, Junior status (60+ credits), earned an "A" in the course student will be serving as a teaching assistant for. F,S,SS.

PSYC 395. Practical Experiences in Psychology. 1-4 Credits.
A practical work or volunteer experience associated with the student's academic study of psychology. Arranged by mutual agreement among student, department, and placement site. Repeatable up to 8 credits. Prerequisites: PSYC 111, junior or senior status, and a minimum overall or major GPA of 3.0. Prerequisite or Corequisite: PSYC 320. Repeatable to 8 credits. S/U grading. F,S,SS.

PSYC 397. Cooperative Education. 1 Credit.
A practical work experience associated with the student's academic area of psychology. Arranged by mutual agreement among student, department and employer. Students need to contact the Cooperative Education office. Prerequisites: PSYC 111, junior or senior status, PSYC 303 with a grade of C or above, and a minimum GPA of 2.0. Repeatable to 8 credits. S/U grading. F,S,SS.

PSYC 405. History and Systems of Psychology. 3 Credits.
A consideration of the historical background and development of problem areas in psychology and a survey of contemporary psychological theories. Prerequisites: PSYC 303 and senior status. F,S.
PSYC 421. Diversity Psychology. 3 Credits.
Origins and consequences of psychological differences among individual and groups with special emphasis on sex differences and racial differences.
Prerequisites: PSYC 111, PSYC 241, and PSYC 250 or consent of instructor. S, even years.

PSYC 433. Psychology of Learning. 4 Credits.
Principles of animal and human learning, with special emphasis on the acquisition, extinction and retention of learned behavior patterns. Course includes recitation and laboratory. Prerequisites: PSYC 111 and PSYC 303. F.

PSYC 436. Perception. 4 Credits.
Perceptual basis of behavior. Prerequisites: PSYC 303 and BIOL 111 or BIOL 150 or BIOL 151 or PSYC 330. S.

PSYC 437. Physiology of Behavior and Psychophysiologic Measurement. 4 Credits.
An advanced course covering major topics of physiological psychology while also introducing students to psychophysiological recording techniques used in research. While physiology and anatomy of the central and peripheral nervous systems will be briefly reviewed, students are expected to have basic knowledge of neuroscience, behavioral science, and research methodology. Laboratory time will focus on demonstration and practice of psychophysiological recording techniques and data analysis. Prerequisites: PSYC 303 and BIOL 111 or BIOL 150 or BIOL 151 or ANAT 204 or PSYC 330. F, odd years.

PSYC 439. Cognitive Psychology. 4 Credits.
An examination of theory and research on attention, memory, language, comprehension, reasoning, problem-solving, and decision-making. Course includes recitation and laboratory. Prerequisites: PSYC 111 and PSYC 303. F, odd years.

PSYC 441. Case-Based Applied Statistics. 3 Credits.
Emphasis on the hands-on application and interpretation of a variety of descriptive and inferential statistical procedures using a computer software package (SPSS). Prerequisites: PSYC 111, PSYC 241 and PSYC 303. On demand.

PSYC 460. Advanced Social Psychology. 3 Credits.
In depth examination of the theoretical and empirical literature in social psychology focusing on attitudes, stereotyping and prejudice, interpersonal relationships, social cognition, personality and the self, and group behavior. Prerequisites: PSYC 111, PSYC 303, and PSYC 361 or SOC 361. F.

PSYC 470. Intro Clinical Psychology. 3 Credits.
A systematic survey of the field of clinical psychology; basic concepts in diagnosis, psychotherapy, research and professional problems. Prerequisites: PSYC 111, PSYC 241, and PSYC 270 or consent of instructor. F.

PSYC 475. Psychological Helping Skills. 2 Credits.
This course introduces students to basic helping skills used by mental health professionals and reviews empirically supported models of the helping and change process. Students are given frequent opportunities to apply the skills learned. Prerequisites: Senior status, PSYC 111, PSYC 270, and PSYC 303. Prerequisite or Corequisite: PSYC 320. F.

PSYC 486. Conflict Symposium. 3 Credits.
In-depth study of a current topic in the conflict field in the format of a week-long symposium. Prerequisite: Permission of instructor. SS.

PSYC 489. Senior Thesis. 1-6 Credits.
Supervised independent study culminating in a thesis. Prerequisites: PSYC 304, PSYC 494 (2 credits), GPA of 3.2 or higher, Junior status, and department permission. Repeatable to 6 credits. F, S, SS.

PSYC 492. Individual Projects in Psychology. 1-4 Credits.
This course is intended to provide students with indepth experiences not covered adequately in usual course offerings. These experiences may include independent research projects or extensive readings on topics of interest. Prerequisites: PSYC 111 and consent of instructor. Repeatable to 8 credits. F, S, SS.

PSYC 493. Instructional Experiences in Psychology. 2 Credits.
Students will receive training and practical experiences in providing instruction in psychology at the collegiate level. Such experiences include serving as an undergraduate teaching assistant or tutor for psychology courses with a faculty mentor. Prerequisites: Junior or senior status, “A” in course they are serving, minimum overall GPA of 3.2 or higher, and permission of instructor. Prerequisites or Corequisites: PSYC 320 and PSYC 492. Repeatable to 8 credits. S/U grading. F, S, SS.

PSYC 494. Advanced Individual Research. 1-4 Credits.
Advanced experience as a research assistant in a research laboratory. A total of 45 hours is typically required over the course of the semester per credit. Prerequisites: PSYC 303 and consent of instructor. Repeatable to 8 credits. F, S, SS.

PSYC 499. Advanced Special Topics in Psychology. 1-4 Credits.
Repeatable when topics vary. Prerequisites: PSYC 111 and consent of instructor. Repeatable. On demand.

Bachelor of Arts/Bachelor of Science with Major in Psychology

B.A. with Major in Psychology

Required 120 credits (36 of which must be numbered 300 or above, and 30 of which must be from UND) including:

I. Essential Studies Requirements (see University ES listing).

II. The Following Curriculum:

At least 36 major hours, including:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYC 111</td>
<td>Introduction to Psychology</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 241</td>
<td>Introduction to Statistics</td>
<td>4</td>
</tr>
<tr>
<td>PSYC 303</td>
<td>Research Methods in Psychology</td>
<td>4</td>
</tr>
<tr>
<td>PSYC 320</td>
<td>Professional Development &amp; Ethics</td>
<td>2</td>
</tr>
<tr>
<td>PSYC 405</td>
<td>History and Systems of Psychology</td>
<td>3</td>
</tr>
</tbody>
</table>

Students must complete at least two 400-level courses from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYC 421</td>
<td>Diversity Psychology</td>
<td>4</td>
</tr>
<tr>
<td>PSYC 433</td>
<td>Psychology of Learning</td>
<td>4</td>
</tr>
<tr>
<td>PSYC 436</td>
<td>Perception</td>
<td>2</td>
</tr>
<tr>
<td>PSYC 437</td>
<td>Physiology of Behavior and Psychophysiologic Measurement</td>
<td>2</td>
</tr>
<tr>
<td>PSYC 439</td>
<td>Cognitive Psychology</td>
<td>2</td>
</tr>
<tr>
<td>PSYC 441</td>
<td>Case-Based Applied Statistics</td>
<td>2</td>
</tr>
<tr>
<td>PSYC 460</td>
<td>Advanced Social Psychology</td>
<td>2</td>
</tr>
<tr>
<td>PSYC 470</td>
<td>Intro Clinical Psychology</td>
<td>2</td>
</tr>
</tbody>
</table>

Students must also complete at least 2 credits of applied experience from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYC 395</td>
<td>Practical Experiences in Psychology</td>
<td>1-4</td>
</tr>
<tr>
<td>PSYC 475</td>
<td>Psychological Helping Skills</td>
<td>2</td>
</tr>
<tr>
<td>PSYC 493</td>
<td>Instructional Experiences in Psychology</td>
<td>2</td>
</tr>
</tbody>
</table>

PSYC 111 Introduction to Psychology is prerequisite to all other psychology classes.

Required in other departments:

<table>
<thead>
<tr>
<th>Required</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level II proficiency in a foreign language, or equivalent proficiency in American Sign Language</td>
<td>8</td>
</tr>
</tbody>
</table>

Select two of the following (with lab):

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 111</td>
<td>Concepts of Biology</td>
<td>2</td>
</tr>
<tr>
<td>BIOL 150</td>
<td>General Biology I</td>
<td>2</td>
</tr>
<tr>
<td>BIOL 151</td>
<td>General Biology II</td>
<td>2</td>
</tr>
<tr>
<td>ANAT 204</td>
<td>Anatomy for Paramedical Personnel</td>
<td>2</td>
</tr>
<tr>
<td>PSYC 330</td>
<td>Biological Bases of Behavior (includes lab)</td>
<td>2</td>
</tr>
</tbody>
</table>

B.S. with Major in Psychology

Required 120 credits (36 of which must be numbered 300 or above and 30 of which must be from UND) including:
I. Essential Studies Requirements (see University ES listing).

II. The Following Curriculum:

At least 36 major hours, including:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYC 111</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 241</td>
<td>4</td>
</tr>
<tr>
<td>PSYC 303</td>
<td>4</td>
</tr>
<tr>
<td>PSYC 304</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 320</td>
<td>2</td>
</tr>
<tr>
<td>PSYC 405</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 493</td>
<td>2</td>
</tr>
</tbody>
</table>

Students must complete one of the following (laboratory-based course):

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYC 363</td>
<td>4</td>
</tr>
<tr>
<td>PSYC 366</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 399</td>
<td>4</td>
</tr>
<tr>
<td>PSYC 460</td>
<td>3</td>
</tr>
</tbody>
</table>

**Certificate in Behavioral Health**

Students completing this certificate will need to complete a minimum of 9 credits including the two required courses below and at least one of the approved electives.

**Required Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYC 311</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 335</td>
<td>3</td>
</tr>
</tbody>
</table>

**Approved Electives**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYC 370</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 372</td>
<td>3</td>
</tr>
</tbody>
</table>

**Certificate in Cyberpsychology**

Students are required to complete the two required courses below and one elective for a total of at least 9 credits.

**Certificate Requirements**

Required courses:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYC 362</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 395</td>
<td>3</td>
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</table>

Approved elective from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>PSYC 301</td>
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</tr>
<tr>
<td>PSYC 433</td>
<td>4</td>
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<tr>
<td>PSYC 436</td>
<td>4</td>
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<tr>
<td>PSYC 439</td>
<td>4</td>
</tr>
<tr>
<td>CJ 320</td>
<td>3</td>
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</tbody>
</table>

**Certificate in Forensic Psychology**

**Certificate Requirements**

Required minimum of 9 total credits

Required Core Courses (6 credits):

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYC 362</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 395</td>
<td>3</td>
</tr>
</tbody>
</table>

Or

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYC 494</td>
<td>3</td>
</tr>
</tbody>
</table>

Elective course from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYC 270</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 361</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 460</td>
<td>3</td>
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<tr>
<td>PSYC 499</td>
<td>3</td>
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<tr>
<td>CJ 201</td>
<td>3</td>
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</tbody>
</table>

**Minor in Psychology**

Required 20 credits, including:

<table>
<thead>
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<th>Course</th>
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<tbody>
<tr>
<td>PSYC 361</td>
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<tr>
<td>PSYC 362</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 363</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 421</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 439</td>
<td>4</td>
</tr>
<tr>
<td>PSYC 460</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYC 311</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 210</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 301</td>
<td>3</td>
</tr>
</tbody>
</table>
PSYC 111  Introduction to Psychology  3
PSYC 250  Developmental Psychology  4
PSYC 270  Abnormal Psychology  3

Students receiving teaching certification in secondary education must also include:

PSYC 241  Introduction to Statistics  4
PSYC 303  Research Methods in Psychology  4

Public Affairs

B.S. with Major in Public Affairs (p. 196)

Minor in Public Administration (p. 197)

POLS 115. American Government I. 3 Credits.
An introduction to political science through the study of the American political system: The Constitution; the political processes; the structure, powers and procedures of the Presidency, Congress, and the Judiciary. F.S.

POLS 116. State and Local Government. 3 Credits.
Structure, function and problems of state and local government; executive, legislative, and judicial processes; federalism and metropolitan government. F.S.

POLS 250. Introduction to Public Administration. 3 Credits.
Introduction to the development of public administration in the United States and to the concepts and methods used in its practice. The political aspects of the public bureaucracy and contemporary issues are also highlighted. Prerequisite: POLS 115. F.

POLS 300. Introduction Research Methods. 3 Credits.
General consideration of research methods and data analysis in political science and the social sciences. F.

POLS 308. Intergovernmental Relations. 3 Credits.
Analyzes the growing interrelationship of federal, state and local governments with emphasis on financial aspects.

POLS 328. Legislative Processes. 3 Credits.
Emphasis will be placed on the structure, functions, and duties of Congress, as well as congressional elections, patterns of congressional leadership, policy successes and failures, and the relationship between Congress and the federal courts and Congress and the U.S. Presidency, S, even years.

POLS 329. Presidential Institutions and Management. 3 Credits.
This course focuses on the intersection of politics and management with the executive branch. Special emphasis is placed on the roles of institutions and critical executive branch actors such as the President in the management and execution of public policy. S, odd years.

POLS 404. Urban Politics and Administration. 3 Credits.
Analysis of the socio-economic context of urban America and its impact on politics, policy, and administration. Prerequisite: POLS 115. S.

POLS 432. Public Policy Making Process. 3 Credits.
Two-thirds of the class is devoted to understanding the stages of the policy process: (1) Problem Identification and Agenda Setting; (2) Policy formulation; (3) Policy Adoption; (4) Policy Implementation; and (5) Policy Evaluation. The last third applies the model to substantive policy areas such as health, environment, education. Prerequisite: POLS 115. S.

POLS 437. Administrative Processes. 3 Credits.
Explanation of theoretical and practical aspects of personnel and financial management in the public sector. F, even years.

POLS 480. Administrative Internship. 1-3 Credits.
On-the-job training in a governmental or non-profit organization position with final report and analysis of the agency by the intern. Prior approval of instructor required before enrollment. Prerequisites: GPA of 3.0, 12 hours in POLS, course related to cooperative experience, and permission of department. Repeatable to 3 credits. S/U grading. On demand.

POLS 493. Professional Project Public Administration. 3 Credits.
An independent study where students will independently develop a paper under supervision, which demonstrates the ability to use the knowledge and skills of public administration to address public administration issues. Prerequisite: Senior standing. S.

POLS 495. Senior Colloquium in Political Science and Public Administration. 3 Credits.
A capstone course in Political Science designed to integrate the subareas of the discipline. The development of the discipline, its great thinkers, and current directions will be examined. This course is designed for majors only. Prerequisite: Senior standing and 21 hours of POLS credit or consent of the instructor. S.

Note: Additional elective courses are listed under Political Science.

Bachelor of Science with Major in Public Affairs

Required 120 credits (36 of which must be numbered 300 or above) including:

I. Essential Studies Requirements (see University ES listing).

II. The applicable College of Business and Public Administration Requirements (see BPA listing).

III. Common Core Curriculum

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>POLS 115</td>
<td>American Government I</td>
<td>3</td>
</tr>
<tr>
<td>or POLS 116</td>
<td>State and Local Government</td>
<td>3</td>
</tr>
<tr>
<td>ACCT 200</td>
<td>Elements of Accounting I</td>
<td>3</td>
</tr>
<tr>
<td>ECON 201</td>
<td>Principles of Microeconomics</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 300</td>
<td>Principles of Management</td>
<td>3</td>
</tr>
<tr>
<td>POLS 437</td>
<td>Administrative Processes</td>
<td>3</td>
</tr>
<tr>
<td>POLS 495</td>
<td>Senior Colloquium in Political Science and Public Administration</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 18

All students in the major follow the common core curriculum along with courses in one of the two tracks below: Public Administration or Nonprofit for a total of 33 credit hours to complete the major.

IV. Public Administration track

Required:

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 210</td>
<td>Introduction to Business and Economic Statistics</td>
<td>3</td>
</tr>
<tr>
<td>POLS 250</td>
<td>Introduction to Public Administration</td>
<td>3</td>
</tr>
<tr>
<td>POLS 300</td>
<td>Introduction Research Methods</td>
<td>3</td>
</tr>
<tr>
<td>Electives: select two from the following</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>ACCT 201</td>
<td>Elements of Accounting II</td>
<td></td>
</tr>
<tr>
<td>MGMT 302</td>
<td>Human Resource Management</td>
<td></td>
</tr>
<tr>
<td>MGMT 310</td>
<td>Organizational Behavior</td>
<td></td>
</tr>
<tr>
<td>ECON 324</td>
<td>Public Finance</td>
<td></td>
</tr>
<tr>
<td>POLS 328</td>
<td>Legislative Processes</td>
<td></td>
</tr>
<tr>
<td>or POLS 329</td>
<td>Presidential Institutions and Management</td>
<td></td>
</tr>
<tr>
<td>POLS 404</td>
<td>Urban Politics and Administration</td>
<td></td>
</tr>
<tr>
<td>POLS 432</td>
<td>Public Policy Making Process</td>
<td></td>
</tr>
<tr>
<td>Other courses with academic advisor approval</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 15

V. Nonprofit track

Required:

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>POLS 200</td>
<td>Introduction to the Nonprofit Sector</td>
<td>3</td>
</tr>
<tr>
<td>POLS 361</td>
<td>Nonprofit Management (Undergrad)</td>
<td>3</td>
</tr>
<tr>
<td>POLS 480</td>
<td>Administrative Internship</td>
<td>3</td>
</tr>
<tr>
<td>Electives: select two from the following</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>ACCT 201</td>
<td>Elements of Accounting II</td>
<td></td>
</tr>
<tr>
<td>POLS 306</td>
<td>American Constitution-Civil Liberties</td>
<td></td>
</tr>
<tr>
<td>MGMT 310</td>
<td>Organizational Behavior</td>
<td></td>
</tr>
<tr>
<td>POLS 321</td>
<td>International Human Rights</td>
<td></td>
</tr>
<tr>
<td>POLS 351</td>
<td>Women and Politics</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 9
RHS 200. Helping Skills in Community Services. 3 Credits.
This course provides the student with the basic knowledge and skills associated with the helping process, including interviewing skills, as practiced in a variety of community services settings. A special focus will be on the problem-solving process and interaction skills used in direct service activities with individuals. Helping skills require a knowledge of interpersonal relationships and the effective use of interpersonal behaviors. This combination of knowledge and skills will benefit any individual wanting to increase effectiveness when working with people. F,SS.

RHS 250. Contemporary Issues in Rehabilitation. 3 Credits.
This course introduces students to the profession of rehabilitation and examines how persons with disabilities are treated in our society. Topics include: community and national rehabilitation agencies, political and social influences on rehabilitation programs, conceptualization of disability, attitude development and change, building accessible and inclusive communities, and transforming the media. Opportunities for involvement with agencies providing rehabilitation services will be provided. S,SS.

RHS 260. Inclusion in Recreation Settings. 3 Credits.
Study of individuals with disabling conditions and their leisure-related needs with emphasis on integration strategies and legislation that facilitate community involvement. F, S.

RHS 350. Overview of Disabilities. 3 Credits.
This course provides an overview of physical and mental disabilities for rehabilitation professionals, including the medical, psychological, social, and vocational aspects of specific disabilities. Medical terminology, etiology, treatment, interventions, and prognosis of various disabilities will be presented. Prerequisite: RHS 250 or consent of instructor. F.

RHS 375. Community Living Topics. 3 Credits.
This course provides an introduction to independent living for special populations, such as individuals with physical disabilities, developmental disabilities, or serious emotional disturbances. Topics include community-based programming, the deinstitutionalization movement, legislative issues, and the concepts of integration, inclusion, and normalization. Repeatable to a maximum of 6 credits. Repeatable to 6 credits. F,S,SS.

RHS 450. Vocational Assessment and Job Acquisition. 3 Credits.
Review of the basic principles of testing along with various instruments and techniques used in the assessment of persons with disabilities. Use of assessment information in the job acquisition process and the importance of work for individuals with disabilities are also addressed. S.

RHS 455. Rehabilitation Process. 3 Credits.
This course examines the history, philosophy, and ethical standards of the rehabilitation profession. Topics include the following: experiences of people with disabilities throughout history, legislation affecting persons with disabilities, public and private rehabilitation systems, case management principles, role and function of rehabilitation counselors, principles of independent living, and community resources utilized in rehabilitation programs. F.

RHS 493. Senior Capstone Seminar. 3 Credits.
This seminar is designed to integrate the rehabilitation and human services curriculum with actual rehabilitation practice while in the internship. This is accomplished through journals, written assignments, oral presentations, and seminar discussions. The philosophical and ethical base of the profession will be explored, along with the analysis of critical thinking and effective decision making skills. Prerequisite: RHS 455 or consent of instructor. F,S,SS.

RHS 497. Internship in Rehabilitation. 9 Credits.
This course will allow students to apply theory to practice within the field of rehabilitation services. A 400-hour educationally-focused internship in an approved rehabilitation setting will provide an opportunity to integrate rehabilitation knowledge, values, and skills at the beginning level of professional practice. Prerequisite: RHS 455 or consent of the instructor. Corequisite: RHS 493. S/U grading. F,S,SS.

RHS 499. Special Topics. 1-3 Credits.
Supervised instruction or research which explores topics related to rehabilitation and human services. Repeatable to 12 credits. Prerequisite: Consent of instructor. Repeatable to 12 credits. F,S,SS.

Bachelor of Science in Rehabilitation and Human Services

Required 120 credits which must include the following:

I. Essential Studies Requirements (see University ES listing).

II. College of Education and Human Development requirements (see EHD listing).

III. Core Curriculum (36 credits):

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>COUN 250</td>
<td>Dialogue on U.S. Diversity</td>
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</tr>
<tr>
<td>RHS 200</td>
<td>Helping Skills in Community Services</td>
<td>3</td>
</tr>
<tr>
<td>RHS 250</td>
<td>Contemporary Issues in Rehabilitation</td>
<td>3</td>
</tr>
<tr>
<td>RHS 350</td>
<td>Overview of Disabilities</td>
<td>3</td>
</tr>
<tr>
<td>RHS 450</td>
<td>Vocational Assessment and Job Acquisition</td>
<td>3</td>
</tr>
<tr>
<td>RHS 455</td>
<td>Rehabilitation Process</td>
<td>3</td>
</tr>
<tr>
<td>RHS 493</td>
<td>Senior Capstone Seminar</td>
<td>3</td>
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<tr>
<td>RHS 497</td>
<td>Internship in Rehabilitation</td>
<td>9</td>
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Any Research Methods Class, e.g.:

<table>
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<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>SOC 323</td>
<td>Sociological Research Methods</td>
<td>3</td>
</tr>
<tr>
<td>or PSYC 303</td>
<td>Research Methods in Psychology</td>
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</tbody>
</table>

Any Statistics Course, e.g.:

<table>
<thead>
<tr>
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<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOC 326</td>
<td>Sociological Statistics</td>
<td>3</td>
</tr>
<tr>
<td>or PSYC 241</td>
<td>Introduction to Statistics</td>
<td></td>
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</table>

Total Credits 36-38
IV. Extra Departmental Requirements (13 credits):

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYC 250</td>
<td>Developmental Psychology</td>
<td>4</td>
</tr>
<tr>
<td>PSYC 270</td>
<td>Abnormal Psychology</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 360</td>
<td>Introduction to Personality</td>
<td>3</td>
</tr>
<tr>
<td>SOC 361</td>
<td>Social Psychology (Psyc 361 also acceptable)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Total Credits</strong></td>
<td><strong>13</strong></td>
</tr>
</tbody>
</table>

V. At Least One Concentration from the Following (10 credits):

**Substance Abuse**
- SWK 315 Substance Use and Abuse
- RHS 260 Inclusion in Recreation Settings
- PPT 410 Drugs Subject to Abuse
- PSYC 270 Abnormal Psychology
- SOC 355 Drugs and Society

**Mental Health**
- RHS 375 Community Living Topics (Severe Mental Illnesses)
- RHS 260 Inclusion in Recreation Settings
- PSYC 270 Abnormal Psychology
- T&L 319 Integrating Diverse Needs in Educational Settings

**Gerontology**
- RHS 260 Inclusion in Recreation Settings
- SWK 313 Orientation to Gerontology
- PSYC 355 Adulthood and Aging
- SOC 352 Aging and Society
- NURS 490 Transcultural Health Care Theories, Research, and Practice

**Developmental Disabilities**
- RHS 375 Community Living Topics (Developmental Disabilities)
- RHS 260 Inclusion in Recreation Settings
- T&L 315
- T&L 319 Integrating Diverse Needs in Educational Settings

**Other Specialty Areas**
At least 10 credits from related fields such as the following:
- CSD 343 Language Development
- NURS 490 Transcultural Health Care Theories, Research, and Practice
- PSYC 270 Abnormal Psychology
- RHS 200 Helping Skills in Community Services
- RHS 375 Community Living Topics
- RHS 260 Inclusion in Recreation Settings
- RHS 450 Vocational Assessment and Job Acquisition
- RHS 455 Rehabilitation Process

Total Credits: 15

II. Elective Courses (5 credits from the following):

- ANAT 204 Anatomy for Paramedical Personnel
- CSD 343 Language Development
- NURS 490 Transcultural Health Care Theories, Research, and Practice
- PSYC 270 Abnormal Psychology
- RHS 200 Helping Skills in Community Services
- RHS 375 Community Living Topics
- RHS 260 Inclusion in Recreation Settings

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**Social Science**

B.A. with Major in Social Science (p. 198)

**Bachelor of Arts with Major in Social Science**

Required 120 credits (36 of which must be numbered 300 or above, and 30 of which must be from UND) including:

I. Essential Studies Requirements (see University ES listing).

II. At least 60 credits (24 of which must be upper division) from at least 3 of the following departments: Anthropology, Criminal Justice, Economics, Geography*, History, Political Science, Psychology, and Sociology.

Students may also choose to complete an optional subplan for directed study around a theme:

**Health and Human Services**
- a. At least 21 credits from Psychology
- b. At least 15 credits from Sociology
- c. At least 12 credits from Anthropology

**Economic and Political Science Studies**
- a. At least 21 credits from Economics
- b. At least 15 credits from Political Science
- c. At least 12 credits from Sociology

* For Geography courses carrying Social Science credit, see University ES listing.

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**Social Work (SWk)**

B.S. in Social Work (p. 199)

B.S.S.W. Second Degree Program (p. 200)

Minor in Gerontology (p. 200)

Minor in Chemical Dependency (p. 200)

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**Courses**

**SWK 255. Introduction to Social Work. 4 Credits.**
An introduction to the social work profession including: the development of the profession, generalist practice, the problem solving process, the strengths perspective, social work values and ethics, levels of practice (individual, family, group, community and organization), and fields of practice; 40 hours of volunteer experience. F.S.
SWK 257. Human Behavior and the Social Environment I. 3 Credits.
Application of theories and knowledge from the liberal arts. Application of social work theory across the life span. An emphasis on social systems theory as the conceptual framework. Biopsychosocio-cultural aspects of human development. Prerequisites or Corequisites: PSYC 111 and SOC 110. F,S.

SWK 311. Child Welfare. 3 Credits.
Preparation for child Welfare work. Child protection services, juvenile court procedures, day care services, the rights of children, foster homes and adoption. S.

SWK 312. Social Work and the Legal Process. 2 Credits.
Introduction to the legal system's interaction with the human service delivery system. F.

SWK 313. Orientation to Gerontology. 3 Credits.
Introduction to gerontology including an overview of the field of gerontology, theories of aging, interdisciplinary teaming, demographics, and programs. F.

SWK 315. Substance Use and Abuse. 2 Credits.
Introduction to the dynamics of drug addiction and related issues, with special emphasis on alcohol. S.

SWK 316. Interprofessional Health Care. 1 Credit.
The focus of this course is on developing skills needed to work effectively with an interprofessional health and mental health care team using a patient-centered approach. Case studies are the primary teaching strategy. Students enrolled include: social work, physical therapy, nursing, occupational therapy, medicine, communication science disorders, clinical lab science, physician assistant, and dietetics. Prerequisite: Admission in the BSSW Program. S/U grading. F,S.

SWK 317. Social Work Research. 3 Credits.
Provides students with an understanding of basic qualitative and quantitative research methods. In SWK 317, students also gain and apply skills related to the critical evaluation of research. This course provides students with foundational knowledge and skills necessary to understand and undertake practice evaluation in practice courses, field placements, and in entry-level practice settings. Prerequisite: Admission to the BSSW Program. Prerequisite or Corequisite: Statistics. F,S.

SWK 318. Mental Health. 2 Credits.
Overview of the mental health service delivery system with a focus on case management skills and the role of social work in the provision of mental health services. F.

SWK 357. Human Behavior and the Social Environment II. 3 Credits.
Application of social work theory and research across the life span, with social systems theory as the conceptual framework. Theories regarding development of groups, communities and organizations. Prerequisite: Admission in the BSSW Program. F,S.

SWK 397. Cooperative Education. 1-6 Credits.
Individually supervised experiences in a human service agency. Integrates social work theory with practice. Contact the Cooperative Education Office. Prerequisite: Consent of instructor. S/U grading. F,S,SS.

SWK 424. Generalist Social Work Practice with Individuals and Families. 3 Credits.
Generalist practice with individuals and families within the context of evidence-based interventions. Develop skills to engage, assess, intervene, and evaluate social work practice with individuals and families. Prerequisite: Admission in the BSSW Program. F,S.

SWK 434. Generalist Social Work Practice with Task and Treatment Groups. 3 Credits.
Generalist practice with task and treatment groups within the context of evidence-based interventions. Develop skills to engage, assess, plan, intervene, and evaluate social work practice with groups. Prerequisite: Admission to the BSSW program. Prerequisite or Corequisite: SWK 357. F,S.

SWK 442. Social Policy. 3 Credits.
Provides knowledge of social policy, and develops critical analysis skills to advance social and economic well-being and understanding of the interaction between research, practice and policy. Prerequisite: Admission in the BSSW Program. F,S.

SWK 454. Generalist Social Work Practice with Communities and Organizations. 3 Credits.
Generalist practice with organizations and communities within the context of evidence-based interventions. Develop skills to engage, assess, intervene, and evaluate social work practice with communities and organizations. Prerequisite: Admission to the BSSW program. Prerequisite or Corequisite: SWK 357. F,S.

SWK 481. Field Education I. 5 Credits.
Provides learning opportunities in generalist social work practice emphasizing the core competencies and demonstration of practice behaviors. Connect the theoretical and conceptual contributions of the classroom with the practical world of the internship setting. Also can be taken with SWK 483 for a one-semester block placement in an approved human service organization. Prerequisite: Admission to field program. Corequisite: SWK 482. S/U grading. F,S,SS.

SWK 482. Field Education Seminar I. 1 Credit.
Integrates classroom content with actual practice. Corequisite: SWK 481. F,S,SS.

SWK 483. Field Education II. 5 Credits.
Provides learning opportunities in generalist social work practice emphasizing the core competencies and demonstration of practice behaviors. Connect the theoretical and conceptual contributions of the classroom with the practical world of the internship setting. Corequisite: SWK 484. Prerequisite or Corequisite: SWK 481. S/U grading. F,S,SS.

SWK 484. Field Education Seminar II. 1 Credit.
Integrates classroom content with actual practice. Corequisite: SWK 483. F,S,SS.

SWK 488. Senior Honors Thesis. 1-3 Credits.
Supervised independent study culminating in a thesis. Repeatable to a maximum 6 credits. Repeatable to 6 credits. F,S.

SWK 493A. Special Topics. 1-3 Credits.
Individually or group supervised research or interdepartmental studies and seminars in social work related areas. Repeatable to a maximum 9 credits. Regular grading. Prerequisite: SWK 255 or consent of instructor. Repeatable to 9 credits. F,S,SS.

SWK 493B. Special Topics. 1-3 Credits.
Individually or group supervised research or interdepartmental studies and seminars in social work related areas. Repeatable to a maximum 9 credits. S,U grading. Repeatable to 9 credits. F,S,SS.

Bachelor of Science in Social Work

Campus students can apply to the Bachelors of Science Social Work any semester after completing SWK 255 and SWK 257, or while enrolled in these courses. Application due dates and requirements are listed at the Department website. Applications are accepted for the part-time distance program once per year. Distance application due dates and requirements are listed at the Department website. Distance students must be admitted to the B.S. in Social Work program before completing any distance Social Work courses. This is a cohort program, and students cannot be concurrently enrolled in the campus and distance social work programs.

120 credits are required (36 of which must be numbered 300 or above and 30 credits from UND) including:

I. Essential Studies Requirements (see University ES listing).

II. The following curriculum.

**Social Work**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SWK 255</td>
<td>Introduction to Social Work</td>
<td>4</td>
</tr>
<tr>
<td>SWK 257</td>
<td>Human Behavior and the Social Environment I</td>
<td>3</td>
</tr>
<tr>
<td>SWK 317</td>
<td>Social Work Research</td>
<td>3</td>
</tr>
<tr>
<td>SWK 357</td>
<td>Human Behavior and the Social Environment II</td>
<td>3</td>
</tr>
<tr>
<td>SWK 424</td>
<td>Generalist Social Work Practice with Individuals and Families</td>
<td>3</td>
</tr>
<tr>
<td>SWK 434</td>
<td>Generalist Social Work Practice with Task and Treatment Groups</td>
<td>3</td>
</tr>
</tbody>
</table>
Full-Time Second Degree Schedule for BSSW

The student who has secured a bachelor’s degree in a related field and wishes to secure a bachelor’s degree in social work can complete the “Second Degree Program.” The Second Degree Program allows a student to secure a BSSW in one year. Satisfactory completion of a bachelor’s degree in a related field and prerequisites or corequisite of statistics and human biology from an accredited institution are required. Second Degree students must fulfill essential studies requirements or have the equivalent to graduate with a BSSW degree from UND.

If accepted into the Second Degree Program, the schedule to complete the undergraduate degree in one year* is as follows:

### Bachelor of Science in Social Work Second Degree Program

The student who has secured a bachelor’s degree in a related field and wishes to secure a bachelor’s degree in social work can complete the “Second Degree Program.” The Second Degree Program allows a student to secure a BSSW in one year. Satisfactory completion of a bachelor’s degree in a related field and prerequisites or corequisite of statistics and human biology from an accredited institution are required. Second Degree students must fulfill essential studies requirements or have the equivalent to graduate with a BSSW degree from UND.

If accepted into the Second Degree Program, the schedule to complete the undergraduate degree in one year* is as follows:

### Full-Time Second Degree Schedule for BSSW (39 hours)

#### Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>SWK 255 Introduction to Social Work</td>
<td>4</td>
</tr>
<tr>
<td>SWK 257 Human Behavior and the Social Environment I</td>
<td>3</td>
</tr>
<tr>
<td>SWK 317 Social Work Research</td>
<td>3</td>
</tr>
<tr>
<td>SWK 424 Generalist Social Work Practice with Individuals and Families</td>
<td>3</td>
</tr>
<tr>
<td>Social Work Elective</td>
<td>2</td>
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</tbody>
</table>

**Credits: 15**

#### Spring

<table>
<thead>
<tr>
<th>Course</th>
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</thead>
<tbody>
<tr>
<td>SWK 357 Human Behavior and the Social Environment II</td>
<td>3</td>
</tr>
<tr>
<td>SWK 434 Generalist Social Work Practice with Task and Treatment Groups</td>
<td>3</td>
</tr>
<tr>
<td>SWK 442 Social Policy</td>
<td>3</td>
</tr>
<tr>
<td>SWK 454 Generalist Social Work Practice with Communities and Organizations</td>
<td>3</td>
</tr>
</tbody>
</table>

**Credits: 12**

#### Fourth Year

Summer

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>SWK 481 Field Education I</td>
<td>5</td>
</tr>
<tr>
<td>SWK 482 Field Education Seminar I</td>
<td>1</td>
</tr>
<tr>
<td>SWK 483 Field Education II</td>
<td>5</td>
</tr>
<tr>
<td>SWK 484 Field Education Seminar II</td>
<td>1</td>
</tr>
</tbody>
</table>

**Credits: 12**

Total Credits: 72

Courses used to fulfill the approved minor requirements may also be used to meet the above requirements whenever appropriate and applicable.

#### Elective Social Work Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SWK 311 Child Welfare</td>
<td>3</td>
</tr>
<tr>
<td>SWK 312 Social Work and the Legal Process</td>
<td>2</td>
</tr>
<tr>
<td>SWK 313 Orientation to Gerontology</td>
<td>3</td>
</tr>
<tr>
<td>SWK 315 Substance Use and Abuse</td>
<td>2</td>
</tr>
<tr>
<td>SWK 316 Interprofessional Health Care</td>
<td>1</td>
</tr>
<tr>
<td>SWK 318 Mental Health</td>
<td>2</td>
</tr>
<tr>
<td>SWK 397 Cooperative Education</td>
<td>1-4</td>
</tr>
<tr>
<td>SWK 489 Senior Honors Thesis</td>
<td>1-3</td>
</tr>
<tr>
<td>SWK 493A Special Topics</td>
<td>1-3</td>
</tr>
</tbody>
</table>

#### Minor in Chemical Dependency

Required (20 credits) including:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPT 410 Drugs Subject to Abuse</td>
<td>2</td>
</tr>
<tr>
<td>SOC 355 Drugs and Society</td>
<td>3</td>
</tr>
<tr>
<td>SWK 315 Substance Use and Abuse</td>
<td>2</td>
</tr>
</tbody>
</table>

Select four of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>COUN 250 Dialogue on U.S. Diversity</td>
<td></td>
</tr>
<tr>
<td>COUN 529 Dynamics of Addiction</td>
<td></td>
</tr>
<tr>
<td>IS 311 Health and American Indian Cultures</td>
<td></td>
</tr>
<tr>
<td>PSYC 360 Introduction to Personality</td>
<td></td>
</tr>
<tr>
<td>PSYC 270 Abnormal Psychology</td>
<td></td>
</tr>
<tr>
<td>SOC 115 Social Problems</td>
<td></td>
</tr>
<tr>
<td>SOC 335 Families in a Changing Society</td>
<td></td>
</tr>
<tr>
<td>T&amp;L 350 Development and Education of the Adolescent</td>
<td></td>
</tr>
<tr>
<td>CJ 430 Developmental Perspectives on Adolescent Problem Behavior</td>
<td></td>
</tr>
<tr>
<td>PPT 499 Readings in Pharmacology, Physiology and Therapeutics</td>
<td>1-4</td>
</tr>
</tbody>
</table>

**Total Credits: 20-23**

* Students needing to fulfill essential studies requirements may require a longer period to complete the Fast Track.

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**Minor in Gerontology**

The interdisciplinary minor in gerontology enhances professionals’ capacity to work with older persons. It requires four courses in four disciplines. Students select another 9 credits to earn 20 credits in coursework related to gerontology.

**Required:**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SWK 313 Orientation to Gerontology</td>
<td>3</td>
</tr>
<tr>
<td>NURS 284 Functional Changes in Aging</td>
<td></td>
</tr>
<tr>
<td>PSYC 355 Adulthood and Aging</td>
<td>3</td>
</tr>
<tr>
<td>SOC 352 Aging and Society</td>
<td>3</td>
</tr>
</tbody>
</table>

Select three of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHIL 120 Introduction to Ethics</td>
<td></td>
</tr>
<tr>
<td>IS 121 Introduction to American Indian Studies</td>
<td></td>
</tr>
<tr>
<td>N&amp;D 240 Fundamentals of Nutrition</td>
<td></td>
</tr>
<tr>
<td>PSYC 331 Behavior Modification and Therapy</td>
<td></td>
</tr>
<tr>
<td>PSYC 421 Diversity Psychology</td>
<td></td>
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<tr>
<td>RELS 245</td>
<td></td>
</tr>
<tr>
<td>SOC 354 Medical Sociology</td>
<td></td>
</tr>
<tr>
<td>SWK 257 Human Behavior and the Social Environment I</td>
<td></td>
</tr>
</tbody>
</table>

* Course required for licensing in addiction counseling in North Dakota and Minnesota.

† Student must be senior status or graduate level to enroll in this course.
Sociology (Soc)

B.A. with Major in Sociology (p. 202)

Minor in Sociology (p. 202)

Courses

SOC 110. Introduction to Sociology. 3 Credits.
A systematic examination of the social components of human behavior, including the norms, laws, cultural patterns, and economic forces that organize everyday life. Students will analyze theories of society, the structure of social institutions, social conflict and stratification, as well as social interactions among diverse groups of people. F,S,SS.

SOC 115. Social Problems. 3 Credits.
A sociological analysis of major social problems in America. F,S.

SOC 250. Diversity in American Society. 3 Credits.
Students will explore diverse American identities through the intersections of race, ethnicity, gender, social class, sexual orientation, age, and disability status. Theories of intergroup relations, prejudice and discrimination are covered. S.

SOC 252. Criminology. 3 Credits.
This course provides an in-depth investigation into the major criminological theories that explain the causation, occurrence and development of criminal behavior. Crime typologies and the social correlates of crime and victimization are discussed. Provides an explanation of the methods criminologists use to study crime trends and criminal patterns of behavior. F,S.

SOC 253. Delinquency and Juvenile Justice. 3 Credits.
This course focuses on theoretical explanations for the causes, dynamics, and consequences of juvenile delinquency. Students will explore a justice system specifically designed to handle American youth and will be introduced to basic terminology relating to juvenile delinquency and the juvenile justice system. F,S.

SOC 301. Basic Sociological Theory. 3 Credits.
A survey of the main trends in the history of sociological thought. Basic concepts and frames of reference central to sociological theory and analysis are emphasized. F,S.

SOC 306. Social Change and Social Movements. 3 Credits.
The focus of this course is on social change in American society in the context of current environmental and social problems. Topics include definitions, social change, patterns and causes of social change, theoretical explanations for social change, contemporary social movements and the theoretical explanation for their origins and planned social change strategies. On demand.

SOC 309. Selected Topics. 1-4 Credits.
Selected topics in sociology taught at the junior level. Repeatable to 40 credits with different topics. Repeatable to 40 credits. On demand.

SOC 322. Sociological Research Methods. 3 Credits.
This course explores various facets of the sociological research process. The main focus is on the design and implementation of quantitative research, with attention also given to other types of research, including qualitative research and content analysis. F,S.

SOC 326. Sociological Statistics. 3 Credits.
This course introduces students to calculation and application of basic statistical techniques employed by sociologists. Students perform statistical analyses of real data sets using SPSS software. Prerequisite: MATH 93 or any higher mathematics course. F,S.

SOC 331. Community Sociology. 3 Credits.
This course addresses one of the most fundamental concepts in human relationships: community. What is community? How is community related to the physical environment and place? Who defines community? These are some of the core questions of both urban and rural sociology that we will address in this course. On demand.

SOC 335. Families in a Changing Society. 3 Credits.
An exploration of how family forms, norms, and theories have changed over time; the social forces that influence families at each of the major life stages (such as courtship, marriage, parenthood, old age); how statuses such as race, class, gender, and sexuality influence a person's opportunities for family formation and experiences within families; and the social policies that help or hinder family functioning. F.

SOC 340. Sociology of Gender. 3 Credits.
This course is a sociological exploration of how gender dynamics have changed across time and vary globally. How gender creates barriers and opportunities - for both men and women - across multiple facets of social life is emphasized. S.

SOC 352. Aging and Society. 3 Credits.
An introduction to the multidisciplinary study of aging as a lifelong process. Biological, psychological, and sociological theories are reviewed to understand human development over the life course, including the transitions of marriage, work, retirement, and death. Demographic and social structural influences are also discussed in order to examine the effect of an aging population on society. S.

SOC 354. Medical Sociology. 3 Credits.
An examination of the social contexts of health and health care, including the political, economic, and environmental circumstances that shape illness and access to care. This includes a focus on medical institutions as social systems affected by social movements and social change, as well as the social forces that shape patient-provider interactions and the quality of care received. Implications for public policy and practice are considered. On demand.

SOC 355. Drugs and Society. 3 Credits.
Social factors affecting use and control of self-administered psychoactive drugs, including alcohol, cigarettes, marijuana and more illicit substances. Topics include social definitions, causes, controls and consequences of drug problems. S.

SOC 361. Social Psychology. 3 Credits.
The study of individual behavior in its social context: how the individual acts upon the social environment, is acted upon by the environment, and interacts with other individuals. S.

SOC 397. Cooperative Education. 1-6 Credits.
A practical work experience with an employer closely associated with student's academic area. Repeatable to 12 credits. Repeatable to 12 credits. S/U grading. F,S,SS.

SOC 400. Internship in Sociology. 1-5 Credits.
A learning experience in a selected community agency or organization determined by the student's area of interest. The student will select a Sociology professor to oversee the internship, and it is with this professor that the student will complete a contract for the course prior to enrolling. Fieldwork is under the supervision of agency personnel. Two to three hours per week are required in the field per credit hour for each week of the semester. Prerequisite: Instructor approval. Repeatable to 5 credits. S/U grading. F,S.

SOC 407. Political Sociology. 3 Credits.
Sociological analysis of political and parapolitical groups; voting behavior; political socialization process; power elites, societies and systems of government; power structures. On demand.

SOC 409. Selected Topics in Sociology. 3 Credits.
Topics in sociology taught at the senior level. Repeatable to 6 credits with different topics. Repeatable to 6 credits. On demand.

SOC 431. Workplace Dynamics. 3 Credits.
This course focuses on understanding contemporary workplace dynamics, informed by how the organization of work has changed across time. Theories underlying the organization of work are examined, with an emphasis on how workplaces are shaped by larger social forces, how they shape society, and how they intersect with other organizations. The course concludes with an exploration of diversity in the workforce, especially the ramifications of social class, gender, and race/ethnicity in organizational settings. On demand.

SOC 435. Racial and Ethnic Relations. 3 Credits.
A survey of major USA racial and ethnic groups, the histories of their social encounters, and the theoretical perspectives associated with their experiences. On demand.

SOC 436. Social Inequality. 3 Credits.
SOC 437. Population. 3 Credits.
A basic consideration of formal and social demography. The determinants and consequences of population change. On demand.

SOC 450. Deviant Behavior. 3 Credits.
This course examines the nature, types and societal reactions to deviant behavior; special emphasis on the process of social typing, regulation of deviance, deviant subcultures, and identities. On demand.

SOC 475. Sociology Capstone. 3 Credits.
This course is a culminating experience for Sociology majors. Building on work in the major, students write an empirical research paper and present their findings to the Department. Prerequisites: SOC 110, SOC 301, SOC 323, SOC 326 and second semester junior standing. F,S.

SOC 489. Senior Honors Thesis. 1-15 Credits.
Supervised independent study culminating in a thesis. Total not to exceed fifteen credits. Prerequisite: Consent of department and approval of the Honors Committee. F,S.

SOC 492. Research Experience in Sociology. 1-5 Credits.
Designed for students who want instruction in subjects not covered adequately in usual course offerings. Specific arrangements must be made with the instructor prior to registration. Prerequisite: Consent of instructor. Repeatable to a maximum of 10 credits. Repeatable to 10 credits. S/U grading. F,S.

SOC 494. Readings in Sociology. 1-5 Credits.
This course examines the nature, types and societal reactions to deviant behavior; special emphasis on the process of social typing, regulation of deviance, deviant subcultures, and identities. On demand.

Bachelor of Arts with Major in Sociology

Required 120 credits (36 of which must be numbered 300 or above, and 30 of which must be from UND) including:

I. Essential Studies Requirements (see University ES listing).

II. The following Curriculum:

33 credits, including:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOC 301 Basic Sociological Theory</td>
<td>3</td>
</tr>
<tr>
<td>SOC 323 Sociological Research Methods</td>
<td>3</td>
</tr>
<tr>
<td>SOC 326 Sociological Statistics</td>
<td>3</td>
</tr>
<tr>
<td>SOC 475 Sociology Capstone</td>
<td>3</td>
</tr>
<tr>
<td>Additional credits numbered 400 and above *</td>
<td>6</td>
</tr>
<tr>
<td>Electives in Sociology</td>
<td>15</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>33</strong></td>
</tr>
</tbody>
</table>

* excluding SOC 475 Sociology Capstone, SOC 492 Research Experience in Sociology and SOC 494 Readings in Sociology

A concentration in a single supplementary field other than sociology is required of all sociology majors. This concentration may be met in two ways:

1. a language proficiency of level IV in a modern foreign language; or
2. 20 credit hours (at least nine of which must be numbered 300 or above) in any single subject matter taught at this University.

Minor in Sociology

Required 22 credits, including:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOC 301 Basic Sociological Theory</td>
<td>3</td>
</tr>
<tr>
<td>SOC 323 Sociological Research Methods</td>
<td>3</td>
</tr>
<tr>
<td>Courses numbered 300 and above</td>
<td>9</td>
</tr>
<tr>
<td>Electives</td>
<td>7</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>22</strong></td>
</tr>
</tbody>
</table>

Space Studies (SpSt)

Minor in Space Studies (p. 204)

Courses

SPST 200. Introduction to Space Studies. 3 Credits.
An introduction to a variety of topics in space studies including: an overview of planetary science, stellar evolution and the history of the universe; a brief view of the history of national and international activities, an examination of the fundamentals of space flight and human activity in space, a review of some current problems and issues in the space arena, and a projection of the future course of space activities in the coming decades. This is a required course for an undergraduate minor in space studies. F,S.

SPST 220. Space Science and Exploration. 3 Credits.
Revolutionary advances that have occurred in astronomy, the earth sciences and planetary science as a result of our entry into space. This course surveys the manned and robotic space missions which have gathered data for this new view of the Universe. The course introduces concepts in cosmological theory as well as an overview of planetary evolution, solar system dynamical processes and physical characteristics of the planets. Prerequisite: SPST 200. S.

SPST 270. History of the Space Age. 3 Credits.
This course introduces students to the history of human endeavors in space. These include the development of rocketry, the influence of amateur societies and science fiction, the military development of ballistic missiles, and human and robotic spaceflight. Prerequisite: SPST 200 or HIST 102 or HIST 104. F.

SPST 300. The Case for Space. 3 Credits.
This is a multidisciplinary course that will examine the rationales for a wide variety of space exploration and development activities. Topics will include human space flight, space science missions, military and commercial space activities, space resource utilization, and the benefits and problems that society derives from these activities. The socioeconomic, socio-political and multicultural impact of space activities--nationally and globally--will be discussed and debated with the goal of providing students with a broad perspective of the various effects of space activities on modern society. Prerequisite: SPST 200. F, even years.

SPST 310. Introduction to Dinosaurs. 3 Credits.
This course provides a broad introduction to dinosaurs and an examination of the extra-terrestrial influence that appears to have led to their extinction, and which thus redirected the evolution of life on Earth. Each of the major dinosaur groups (theropods such as T. rex, sauropods such as Brontosaurus (Apatosaurus), duckbills, armored dinosaurs such as Stegosaurus, horned dinosaurs such as Triceratops, etc.) is examined as well as their cousins in the air (pterosaurs) and sea (ichthyosaurs) as well as their cousins in the air (pterosaurs) and sea (ichthyosaurs). The course reviews our current models of their origin, evolution, lifestyles, diet, reproductive behavior, and physiology. We examine the data and reasoning that leads to and updates these models. The course also places the dinosaurs in the context of Earth as a geologically evolving planet. The various theories for the dinosaur extinction will be outlined and evaluated. Learning tools include videos (both scientific and popular), dinosaur fossils, and scale models. On demand.

SPST 360. NASA. 3 Credits.
An examination of the National Aeronautics and Space Administration (NASA). NASA was formed in 1958 out of the existing National Advisory Committee on Aeronautics (NACA) and elements from the Army and Navy -- but not the Air Force -- space programs. This course will examine the technologies, the history and the politics involved in each of the NASA elements -- including the one “new” center not inherited from earlier organizations: the Johnson Space Center in Houston. The course will conclude with a picture of NASA today. Prerequisite: SPST 200 or consent of instructor. F.

SPST 405. Space Mission Design. 3 Credits.
A team design project to develop the requirements for a space mission. The specific mission will vary from time to time. Design teams will work on selected portions of the mission. Accompanying lectures will provide background material. Prerequisite: SPST 200. S.
SPST 410. Life Support Systems. 3 Credits.
A review of the physiological effects of living in space including a discussion of current and near-term life support systems equipment for the provision of oxygen, water, food, and radiation protection. In addition, a review will be made of the issues associated with the development of fully closed ecological life-support systems that will be essential to the long-term development of space. Prerequisite: SPST 200. On demand.

SPST 425. Observational Astronomy. 3 Credits.
This course explores aspects of observational astronomy including monochromatic imaging, astrometry, and photometry. Basic observing techniques, astronomical equipment, characteristics of the night sky, data reduction, interpretations, as well as image processing techniques will be taught. Students will learn to operate a remotely controllable Internet telescope and CCD camera. A broadband Internet connection is recommended. Night observing is required. Prerequisite: PHYS 110. S.

SPST 450. International Space Programs. 3 Credits.
This course will introduce students to the major governmental space programs around the world. The history, activities and future directions of the Russian/Soviet, European/ESA, Chinese, Japanese, Indian and other space programs will be explored. International collaborations between the various programs will also be studied. Prerequisite: SPST 200. On demand.

SPST 460. Life in the Universe. 3 Credits.
This course examines the nature and evolution of life on Earth from its origin to the present time in the context of cosmological evolution, chemical evolution, planetary evolution, biological evolution, and cultural evolution. The possibility of life elsewhere in the universe is considered based on the conditions under which life could arise and flourish. Human changes to the Earth are placed within this context. The future of life on Earth is discussed and the social and cultural implications arising from the discovery of extraterrestrial life are explored. On demand.

SPST 470. Special Topics in Space Studies. 1-3 Credits.
Lecture, discussion and readings on specific topics of current interest. May be repeated for credit if topic is different up to a total of 6 credits. Prerequisite: SPST 200. Repeatable to 6 credits. On demand.

SPST 480. Readings in Space Studies. 1-3 Credits.
Directed student readings designed to develop advanced knowledge in a specific area. A written report is required. May be repeated for a total of six credits. Prerequisite: SPST 200 or consent of instructor. Repeatable to 6 credits. F,S,SS.

SPST 491. Independent Study. 2 Credits.
An independent study project culminating in a paper on an approved topic in Space Studies. Requires regular meetings with the instructor. Prerequisites: SPST 200, senior standing, 15 hours of Space Studies, and consent of instructor. F,S,SS.

Minor in Space Studies
Required 20 credits, including:

SPST 200. Introduction to Space Studies 3

Remaining credits from:

SPST 220. Space Science and Exploration 3

SPST 270. History of the Space Age 3

SPST 300. The Case for Space 3

SPST 310. Introduction to Dinosaurs 3

SPST 360. NASA 3

SPST 405. Space Mission Design 3

SPST 406. Course SPST 406 Not Found 3

SPST 407. Course SPST 407 Not Found 3

SPST 408. Course SPST 408 Not Found 3

SPST 410. Life Support Systems 3

SPST 425. Observational Astronomy 3
### Minor in Space Studies

**Required 20 credits, including:**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPST 200</td>
<td>Introduction to Space Studies</td>
<td>3</td>
</tr>
<tr>
<td>SPST 220</td>
<td>Space Science and Exploration</td>
<td>3</td>
</tr>
<tr>
<td>SPST 270</td>
<td>History of the Space Age</td>
<td>3</td>
</tr>
<tr>
<td>SPST 300</td>
<td>The Case for Space</td>
<td>3</td>
</tr>
</tbody>
</table>

**Remaining credits from:**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPST 270</td>
<td>History of the Space Age</td>
<td>3</td>
</tr>
<tr>
<td>SPST 300</td>
<td>The Case for Space</td>
<td>3</td>
</tr>
</tbody>
</table>

**Up to a maximum of 6 credits may also be obtained from the following:**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AVIT 403</td>
<td>Aerospace Law</td>
<td>3</td>
</tr>
<tr>
<td>GEG 374</td>
<td>Environmental Remote Sensing</td>
<td>3</td>
</tr>
<tr>
<td>GEG 475</td>
<td>Digital Image Processing</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 460</td>
<td>Introduction to Astrophysics</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 461</td>
<td>Introduction to Astrophysics II</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Credits:** 70-74
SMED 312. Medical Aspects of Sports. 2 Credits.
A course designed to introduce students to various medical specialities and medical problems and their effects on athletic participation. Prerequisite: Permission of instructor. F.

SMED 313. Intermediate Clinical Practicum II in Athletic Training. 2 Credits.
A course designed to allow students to develop specified clinical competencies in a directed progressive manner. Prerequisite: SMED 481. Corequisite: SMED 320, SMED 321 and SMED 321L. S.

SMED 320. Athletic Training Modalities. 2 Credits.
A course designed to present the theoretical and applied principles and techniques for the application of modalities in sports injury care. Prerequisite: SMED 481. S.

SMED 320L. Laboratory Athletic Training Modalities. 1 Credit.
A course designed to practice the theoretical and applied principles and techniques as they apply to athletic injuries. Prerequisite: SMED 481. Corequisite: SMED 321L. S.

SMED 321. Athletic Training Rehabilitation Techniques. 2 Credits.
A course designed to explain the principles and techniques of rehabilitation. Prerequisite: SMED 481. Corequisite: SMED 321L. S.

SMED 321L. Laboratory Athletic Injury Rehabilitation Techniques. 1 Credit.
A course designed to allow students practical skill development of rehabilitation techniques utilized in athletic injury care as taught in FMed 321. Prerequisite: SMED 481. Corequisite: SMED 321. S.

SMED 325. Pharmacology in Sport. 2 Credits.
This course is designed to teach students the theories and principles of pharmacology as it relates to Athletic Training. S.

SMED 343. Organizational Administration of Athletic Training. 3 Credits.
A course designed to acquaint students with the theories and principles of administration. Administrative functions as they relate to the athletic trainer will be explained. Prerequisite: Senior standing or consent of instructor. S.

SMED 411. Advanced Clinical Practicum I in Athletic Training. 2 Credits.
A clinical course designed to allow the student to develop specified clinical competencies in a directed progressive manner. Prerequisite: SMED 313. F.

SMED 413. Advanced Clinical Practicum II in Athletic Training. 2 Credits.
A clinical course designed to allow the student to develop specified clinical competencies in a directed progressive manner. Prerequisite: SMED 313. S.

SMED 481. Athletic Injury Assessment. 4 Credits.
A course designed to instruct the student in the theories and skills of injury evaluation. Prerequisite: SMED 213. F.

SMED 490. Learning of Systems in Athletic Training. 3 Credits.
Healthcare is interdisciplinary and is best practiced with a team approach. This course will illustrate the team approach in different work settings for athletic trainers and the environment within different health care systems. Students will broaden the knowledge in working with other professions and entities as a part of a team. Topics include trend analysis, case studies, and interviews of health care professionals. Prerequisite: SMED 213. F.

SMED 491. Seminar in Athletic Training. 2 Credits.
Advanced work in athletic training to include surgical and conservative injury management, rehabilitation and injury. Repeatable to 4 credits. Prerequisite: Permission of instructor. Repeatable to 4 credits. F.S.

SMED 494. Directed Studies in Athletic Training. 1-4 Credits.
An in-depth study in a subject area selected by the student under tutorial supervision. Repeatable to 6 credits. Prerequisite: Instructor approval. Repeatable to 6 credits. F.S,SS.

SMED 497. Internship in Athletic Training. 3 Credits.
Off campus athletic training experience designed to expose the student to alternate concepts of care. Repeatable up to 6 credits with instructor permission. Prerequisite: SMED 313. Repeatable to 6 credits. On demand.

Bachelor of Science in Athletic Training

Required 120 credits (36 of which must be numbered 300 or above, and 60 of which must be from a 4-year institution) including:
I. Essential Studies Requirements (see University ES listing).

II. The following curriculum:

Pre-Admission Courses
The student must earn a letter grade of C or better in the following courses to be admitted in the program.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 150</td>
<td>General Biology I</td>
<td>4</td>
</tr>
<tr>
<td>&amp; 150L</td>
<td>and General Biology I Laboratory</td>
<td></td>
</tr>
</tbody>
</table>

The student must earn a letter grade of B or better in the following courses to be admitted in the program.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMED 101</td>
<td>Orientation to Athletic Training</td>
<td>1</td>
</tr>
<tr>
<td>SMED 207</td>
<td>Prevention and Care of Athletic Injuries</td>
<td>2</td>
</tr>
<tr>
<td>SMED 207L</td>
<td>Laboratory Prevention and Care of Athletic Injuries</td>
<td>1</td>
</tr>
</tbody>
</table>

At the time of application to the Athletic Training Program, the student must have completed or be enrolled in all of the above courses. In addition, the student must show proof of First Aid and CPR certifications or enrollment in:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>KIN 110</td>
<td>First Aid and CPR</td>
<td>1</td>
</tr>
</tbody>
</table>

Core Courses
The following core courses are required for the B.S. in Athletic Training:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 121</td>
<td>General Chemistry I</td>
<td>4</td>
</tr>
<tr>
<td>&amp; 121L</td>
<td>and General Chemistry I Laboratory</td>
<td></td>
</tr>
<tr>
<td>COMM 110</td>
<td>Fundamentals of Public Speaking</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 110</td>
<td>College Composition</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 130</td>
<td>Composition II: Writing for Public Audiences</td>
<td>3</td>
</tr>
<tr>
<td>MED 205</td>
<td>Medical Terminology</td>
<td>1</td>
</tr>
<tr>
<td>PHYS 161</td>
<td>Introductory College Physics I (includes lab)</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 162</td>
<td>Introductory College Physics II (includes lab)</td>
<td>4</td>
</tr>
<tr>
<td>PSYC 111</td>
<td>Introduction to Psychology</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 241</td>
<td>Introduction to Statistics</td>
<td>4</td>
</tr>
<tr>
<td>PSYC 250</td>
<td>Developmental Psychology</td>
<td>4</td>
</tr>
<tr>
<td>SOC 110</td>
<td>Introduction to Sociology</td>
<td>3</td>
</tr>
<tr>
<td>Arts &amp; Humanities Requirement</td>
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<tr>
<td>Electives</td>
<td></td>
<td>9</td>
</tr>
</tbody>
</table>

Total Credits 54

Professional Courses
The following professional courses are required for the B.S. in Athletic Training:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANAT 204</td>
<td>Anatomy for Paramedical Personnel</td>
<td>3</td>
</tr>
<tr>
<td>ANAT 204L</td>
<td>Anatomy for Paramedical Personnel Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>SMED 208</td>
<td>Procedures in Athletic Training</td>
<td>1</td>
</tr>
<tr>
<td>SMED 208L</td>
<td>Laboratory Procedures in Athletic Training</td>
<td>1</td>
</tr>
<tr>
<td>SMED 200</td>
<td>Understanding Medicine</td>
<td>3</td>
</tr>
<tr>
<td>SMED 211</td>
<td>Beginning Clinical Practicum I in Athletic Training</td>
<td>1</td>
</tr>
<tr>
<td>SMED 213</td>
<td>Beginning Clinical Practicum II in Athletic Training</td>
<td>1</td>
</tr>
<tr>
<td>SMED 311</td>
<td>Intermediate Clinical Practicum I in Athletic Training</td>
<td>2</td>
</tr>
<tr>
<td>SMED 312</td>
<td>Medical Aspects of Sports</td>
<td>2</td>
</tr>
<tr>
<td>SMED 313</td>
<td>Intermediate Clinical Practicum II in Athletic Training</td>
<td>2</td>
</tr>
<tr>
<td>SMED 320</td>
<td>Athletic Training Modalities</td>
<td>2</td>
</tr>
<tr>
<td>SMED 320L</td>
<td>Laboratory Athletic Training Modalities</td>
<td>1</td>
</tr>
<tr>
<td>SMED 321</td>
<td>Athletic Training Rehabilitation Techniques</td>
<td>2</td>
</tr>
<tr>
<td>SMED 321L</td>
<td>Laboratory Athletic Injury Rehabilitation Techniques</td>
<td>1</td>
</tr>
<tr>
<td>SMED 325</td>
<td>Pharmacology in Sport</td>
<td>2</td>
</tr>
<tr>
<td>SMED 343</td>
<td>Organizational Administration of Athletic Training</td>
<td>3</td>
</tr>
<tr>
<td>SMED 411</td>
<td>Advanced Clinical Practicum I in Athletic Training</td>
<td>2</td>
</tr>
<tr>
<td>SMED 413</td>
<td>Advanced Clinical Practicum II in Athletic Training</td>
<td>2</td>
</tr>
<tr>
<td>SMED 481</td>
<td>Athletic Injury Assessment</td>
<td>4</td>
</tr>
<tr>
<td>SMED 490</td>
<td>Learning of Systems in Athletic Training</td>
<td>3</td>
</tr>
<tr>
<td>SMED 491</td>
<td>Seminar in Athletic Training</td>
<td>2</td>
</tr>
<tr>
<td>N&amp;D 240</td>
<td>Fundamentals of Nutrition</td>
<td>3</td>
</tr>
<tr>
<td>KIN 332</td>
<td>Biomechanics</td>
<td>2</td>
</tr>
<tr>
<td>KIN 402</td>
<td>Exercise Physiology</td>
<td>3</td>
</tr>
<tr>
<td>PPT 301</td>
<td>Human Physiology</td>
<td>4</td>
</tr>
</tbody>
</table>

Teaching and Learning (T&L)

B.S.ED. with Major in Early Childhood Education (p. 211)
B.S.ED. with Major in Elementary Education (p. 211)
B.S.ED. Double Major in Elementary Education and Early Childhood (p. 210)
B.S.ED. with Major in Science (p. 212)
B.S.ED. with Composite Major in Social Studies (p. 209)
B.S.ED. Double Major in Elementary and Middle Level Education (p. 210)
B.S.ED. with Major in Middle Level Education (p. 212)
B.S.ED. in Secondary Education (p. 209)

Secondary Education Licensure (p. 214)

ELL or Bilingual Endorsement (p. 213)

Kindergarten Endorsement (p. 213)

Minor in Early Childhood Education (p. 213)

Minor in Middle Level Education (p. 214)

Minor in Literacy Education (p. 213)

Minor in Special Education (p. 214)

Courses

T&L 220. Lakota Linguistics for Teachers 1. 3 Credits.
This is an introductory course on Lakota linguistics designed for Lakota language teachers. It focuses on three main components of Lakota grammar:
(i) Lakota pronunciation and alphabet, (ii) Lakota inflectional morphology, and (iii) Lakota sentence structure (syntax). The first component is a thorough introduction to Lakota phonemic inventory, historic and current writing systems and methodology on how to teach pronunciation, listening comprehension and how to develop phonemic awareness in second language acquisition of Lakota. The second component offers a comprehensive coverage of Lakota conjugation of all verb classes and types. The third component introduces Lakota sentence structure up to intermediate level. On demand.

T&L 250. Introduction to Education. 3 Credits.
This course is designed for students exploring the profession of teaching in early childhood, elementary, middle, or secondary schools. You will study what it means to be a teacher, the role of schools in a diverse society, and the foundations of education. You will participate in field experiences in schools, role-playing, simulations, and peer-teaching to explore teaching in today’s schools. F,S.

T&L 251. Understanding Individuals with Different Abilities. 3 Credits.
This course is designed to introduce students to foundational knowledge of individuals with different abilities addressing the identification, supports, range of services, assessment components, and evidence-based teaching practices. Historical, legal, cultural, and societal influences that impacts educational success will be explored. F,S,SS.

T&L 252. Child Development. 3 Credits.
Study of the growth and developmental process through adolescence. A basis for understanding basic needs of the normal child and means of meeting them in the child’s home and community environment. F,S.

T&L 286. Field Experience. 1 Credit.
Supervised tutorial or apprentice teaching experience in an early childhood, K-12 classroom, university or community setting approved by the program area. S/U grading. Prerequisite: Consent of instructor. Repeatable to 3 credits. S/U grading. F,S.
T&L 310. Introduction to Early Childhood Education. 3 Credits.
An overview of the early childhood education field, including an introduction to its historical roots; current theories, program models and issues; curriculum development; and typical and atypical development of young children. There will be a minimum of six hours of observation and/or activities in the field. F.S.

T&L 311. Observing and Assessing Children. 3 Credits.
This course acquaints the student with a variety of ways of observing, recording, and analyzing the behavior and development of children. Assessment of children will be analyzed by looking at a variety of assessment activities that can be done with children. There will be a minimum of eight hours of field experience. Prerequisites: Admission to Teacher Education Program and T&L 310. F.S.

T&L 313. Language Development and Emerging Literacy. 3 Credits.
This course examines both typical and atypical development of language and thought in children ages birth-8. Children's emergent literacy is studied within the context of language development. There will be a minimum of eight hours of field experience. Prerequisite: Admission to the Teacher Education program. F.

T&L 316. Behavioral Assessment and Tiered Supports in Education. 3 Credits.
The study of behavior management within a multi-tiered system of support (MTSS) for the educational advancement of children and youths in schools. Behavior concepts, assessments, and interventions are applied within the MTSS framework as defined by contemporary special education laws and regulations. Prerequisite or Corequisite: TL 315. F.S.

T&L 319. Integrating Diverse Needs in Educational Settings. 3 Credits.
This course introduces students to the shared, collaborative responsibility of professionals in education. It emphasizes understanding of different emotional and learning abilities and underscores the requirement that teachers create and modify learning environments and adapt evidence-based teaching strategies and methods. Integrated into this course are concepts of accountability, building collaborative partnerships and facilitating educational programming for inclusive success. F.S.SS.

T&L 320. Infant and Toddler. 3 Credits.
This course is a study of the child's growth and development from birth to 36 months. It will give the student a basis for understanding normal developmental needs of children and means of meeting them in the children's home and community environments. Prerequisite: T&L 252 or PSYC 250 or permission of instructor. S.SS.

T&L 322. Administration and Leadership in Early Childhood Education. 3 Credits.
An investigation of patterns of administration, curriculum organization, spatial resources, and staffing in early childhood settings, serving children 0-8 years old. Topics include federal and state laws and emerging trends in preschool and primary education in the state, region, and nation. Sixteen (16) hours of field experience. Prerequisite: Admission to the Teacher Education program. S.

T&L 324. Integrating the Arts in the Elementary Classroom. 3 Credits.
Learn why integrating the arts in the elementary classroom is critical for student learning and engagement. Design lessons that engage children in learning elementary content through the arts as well as foster children's creative expression. Prerequisite: Admission to the Teacher Education program. F.

T&L 328. Survey of Children's Literature. 3 Credits.
Students survey the broad range of literature written for children. Emphasis is placed on gaining familiarity with the multicultural aspects of literature, understanding the distinguishing characteristics of genre, developing visual literacy with respect to illustration, and acquiring the ability to evaluate literature, as well as its use, with an understanding of children's developmental needs. F.S.

T&L 329. Young Adult Literature. 3 Credits.
Discussion and critical evaluation of contemporary literature, both adolescent and adult, which is of interest to young adults, with an emphasis on fiction, drama, poetry, essays, and biographies. On demand.

T&L 330. Lakota Linguistics for Teachers 2. 3 Credits.
This course builds on LLT 1 and offers a comprehensive coverage of Lakota inflectional and derivational morphology, allowing the students to identify, use and teach all types of Lakota verbs in all their forms. Secondly, the course provides a thorough introduction to Lakota sentence structure (syntax). Prerequisite: T&L 220. On demand.

T&L 333. Methods and Materials: Pre-Kindergarten. 3 Credits.
Exploration of curriculum, methods and materials for use in pre-kindergarten educational settings. Includes selection of materials, creative environments, and planning for the individual needs of children within a group setting. Prerequisites: T&L 310 and admission to the Teacher Education program. Corequisite: T&L 486. F.SS.

T&L 335. Understanding Readers and Writers. 3 Credits.
This foundational course explores the developmental nature of literacy learning, the reading and writing processes, and the conditions for successful literacy learning. Holistic methods for assessing literacy are studied to understand individual language learners. Prerequisite: Admission to the Teacher Education program. F.S.

T&L 336. Social and Emotional Development and Guidance of Children. 3 Credits.
This course examines both typical and atypical social and emotional development in children ages 0-8 as a basis for understanding and working with children in educational settings. The course will also focus on child guidance and behavior issues affecting classroom climate. S.SS.

T&L 338. Home, School and Community Relations. 3 Credits.
The course is an exploration of home school relations. The content will include history, parental involvement in schools, parent-teacher conferences, home visits, parent programs, and resources for parents. F.SS.

T&L 339. Educational Technology. 2 Credits.
Students will demonstrate a sound understanding of technology concepts and operations that not only support classroom curriculum but provide an avenue for continuing professional development. Students will learn to apply technology to facilitate a variety of effective assessment and evaluation strategies. The class will help students understand the social, ethical, legal and human issues that surround the use of technology in PK-12 schools. Prerequisite: Admission to the Teacher Education program. F.S.SS.

T&L 341. Foundations of Middle Level Education. 2 Credits.
This course promotes understanding the needs of early adolescent students and of the interdisciplinary, collaborative teaching approaches associated with the middle school philosophy. The course addresses the components of organization. Prerequisite: Admission to the Teacher Education program. F.

T&L 345. Curriculum, Instruction, and Assessment. 3 Credits.
A general curriculum development and instruction course designed for the undergraduate pre-service middle school and/or secondary teacher across all disciplines. It introduces and provides practice in planning, multiple instructional strategies, and methods of formal and informal assessment. It considers the impact of historical foundations, teaching philosophy, discipline standards, knowledge of diverse learners and special needs, and technology on curriculum development. Prerequisites: Admission to Teacher Education Program and T&L 250. F.S.

T&L 350. Development and Education of the Adolescent. 3 Credits.
A comprehensive examination of the characteristics and behavior of the adolescent student with implications for curriculum and instruction in the junior/ middle and high schools. Topics covered will be transition from childhood to adolescence, including cognitive development, self-concept, physiological changes, social needs and values, and values and attitudes of adolescents. This course will provide an understanding of the wide range of differences in developmental patterns of children and the influences of economic, sociological and psychological factors in development. A field experience is part of the course. Prerequisites: Admission to Teacher Education Program and T&L 250. F.S.

T&L 370. Differentiated Instruction. 3 Credits.
An introduction to the principles of differentiation including responsive instructional and assessment strategies, learner preferences, and the dynamics of a differentiated learning environment. Managing and organizing a differentiated approach to teaching is also presented. S.

T&L 386. Field Experience. 1 Credit.
Supervised tutorial or apprentice teaching, experience in an early childhood, K-12 classroom, university or community setting approved by the program area. Optional. Prerequisites: Admission to Teacher Education Program and T&L 250. S/U grading. F.S.

T&L 390. Special Topics. 1-3 Credits.
May be repeated. Prerequisite: Admission to the Teacher Education Program. Repeatable.
T&L 400. Methods and Materials. 3 Credits.
Various teaching methods and strategies and the materials used in teaching in a subject area. (Some Methods and Materials courses carry an academic department prefix and number. The number of methods courses required by a department may vary. Consult with an adviser.) Some offered F only; some F,S. See adviser. Prerequisites: T&L 250 and T&L 345, and admission to the Teacher Education program. Corequisites: T&L 486. Repeatable to 18 credits. F,S.

T&L 401. School Safety Science. 1 Credit.
Prepares students to plan for and communicate about a wide variety of classroom and lab safety issues. Health and safety issues are examined for the classroom teacher and the students in all science courses, including electrical safety, biological safety, chemical use, storage and disposal, legal issues, liability reduction and cost control are also addressed in detail. Prerequisites: Admission to Teacher Education Program. Corequisite: T&L 400. F.

T&L 404. Assessment in the Elementary Classroom. 1 Credit.
Elementary teachers must know how to design and use classroom assessments across all content areas as a way to monitor student learning and achievement, and to inform their decisions about instruction and the learning environment. This course will outline procedures for designing or selecting, administering, scoring, and interpreting a variety of formative and summative assessments for use in elementary classrooms. By exploring assessments aligned to educational objectives and standards, students will evaluate student learning outcomes across the elementary grades and content areas. In addition, students will become familiar with measures to assess learners with special needs and to assess learners from linguistically and culturally diverse backgrounds.

T&L 405. Data Literacy for Teachers. 1 Credit.
Teachers in all grade levels and program areas must know how to effectively and responsibly use student assessment data to inform their practice and address individual student needs and learning goals. This course will introduce students to various sources of assessment data, how to analyze patterns and themes in the data in order to make individual and programmatic decisions, and how to discuss data trends with colleagues as part of a professional learning community. Through careful examinations of real student data and discussions with community educators and administrators, students in this course will gain an understanding of the role and purpose of data and how to meaningfully use it to guide instruction. F,SS.

T&L 409. Reading in the Content Areas. 3 Credits.
This course emphasizes instructional strategies for reading and writing, as well as the use of varied texts, in the content area classroom. Prerequisite: Admission to the Teacher Education program. S.

T&L 410. Teaching Reading in the Elementary School Classroom (TEAM). 3 Credits.
A study of methods for teaching and assessing reading in the elementary school classroom with an emphasis on planning instruction that is child-centered, process-oriented and literature-based. Prerequisite: Admission to the Teacher Education program; see department for approval. F,S.

T&L 411. Primary Reading and Language Arts. 2 Credits.
This course explores a wide variety of developmentally-appropriate instructional practices for teaching primary level children multiple ways of communicating and experiencing language. This course emphasizes integrating reading, writing, speaking and listening as forms of creative and personal expression. Effective methods of teaching children to decode and encode print are studied. Prerequisites: T&L 335 and admission to the Teacher Education program. Prerequisite or Corequisite: T&L 328. F.S.

T&L 413. Assessing and Correcting Reading Difficulties. 2 Credits.
The focus of this course and practicum is to learn about current approaches to assessment and methods to assist students who are having difficulty with reading and writing. Observations, running records, interviews, and other evaluation procedures are used to learn about reader and writers, and these assessments are used to plan for instruction. Prerequisites: T&L 335 and admission to the Teacher Education program. Corequisites: T&L 414. SS.

T&L 414. Corrective Reading Practicum. 2 Credits.
Applying the knowledge and skills learned in T&L 413, students in this practicum assess, plan for and teach children who are having difficulty with reading and/or writing. Prerequisites: T&L 335 and admission to the Teacher Education program. Corequisites: T&L 413. SS.

T&L 415. Language and Literacy Development of English Language Learners. 3 Credits.
This course includes study of various approaches to ELL/bilingual education, methods of instruction, assessment of English language proficiency and classroom learning, and teaching academic content to ELLs in the general education classroom. Prerequisite: Admission to the Teacher Education program or permission of instructor. F.

T&L 416. Adolescent Literacy Development. 3 Credits.
A study of adolescent literacy development with emphasis on instructional strategies and practices for reading and responding to texts, helping struggling readers, and engagement in literacy. Prerequisite: Admission to the Teacher Education program or permission of instructor. F.

T&L 417. Writing & Language Arts Methods. 2 Credits.
A study of methods for teaching writing and language arts to children in grades K-6. Emphasis is placed on process-oriented writing approaches; spelling and grammar; ways of using language for creative, personal, and content area expression. Prerequisites: Admission to Teacher Education Program and T&L 335 and T&L 328. F,S.

T&L 422. Development of the Gifted and Talented. 2 Credits.
Research and theory for understanding the development needs of the more able child in early childhood and in educational experiences. S.

T&L 423. Assessment and Individualized Planning in Special Education. 3 Credits.
A study of the principles and practices of: (1) obtaining diagnostic information on school-related problems of a student; (2) assimilating this information and prescribing appropriate alterations based on continuous measurement data. Prerequisites or Corequisites: TL 315 and T&L 319. F,S.


T&L 428. Assistive Technology. 1 Credit.
An overview of the various forms of technology (e.g., communication boards, switches, software) that may be used to assist students with disabilities. F,SS.

T&L 430. Social Studies in the Elementary School (Team). 3 Credits.
To understand and analyze the different modes of teaching social studies, to gain the competencies necessary for organizing a unit in the social studies, to gain an understanding of the values and multiple perspectives inherent within the various teaching strategies, to develop a preferred perspective on the ideal nature of Social Studies education. Prerequisite: Admission to the Teacher Education program; see department for approval. F,S.

T&L 432. Learning Environments. 3 Credits.
The purpose of this class is to study psychological, social, and cultural factors that influence classroom behavior and to examine elements that contribute to a positive learning environment. A field experience is include in the course. Prerequisite: Admission to the Teacher Education program. F,SS,SS.

T&L 433. Multicultural Education. 3 Credits.
This class takes an anthropological view of multicultural education. It will help students better understand students in culturally diverse classrooms as well as preparing them to teach about cultural diversity. This class examines several cultures but is particularly interested in Native Americans of North Dakota. Prerequisite: Admission to the Teacher Education program. F,SS,SS.

T&L 440. Mathematics in Elementary School (Team). 3 Credits.
Students explore how to facilitate the learning of mathematics in a constructivist environment through the use of investigations, manipulatives, technology, and holistic forms of assessment. Current trends in teaching mathematics are emphasized, with particular attention to documents created by the National Council of Teachers of Mathematics. Prerequisite: Admission to the Teacher Education program; see department for approval. F,S.

T&L 443. Mathematics for Primary Grades. 2 Credits.
Math for Primary Grades focuses on curriculum and methods for teaching mathematics in kindergarten through the third grade. Students actively engage in projects and activities that help them develop a conceptual understanding of teaching mathematics in a cooperative and constructivist environment where children view themselves as as mathematicians. Emphasis is placed on the use of manipulative, problem solving activities and children's literature in the planning and organizing of developmentally appropriate classroom activities and lessons. Prerequisite: Admission to the Teacher Education program. F,S.
T&L 444. Assessing and Correcting Mathematics Difficulties. 2 Credits.
The focus of this course and the co-requisite practicum is to learn about current approaches to assessment and methods to assist students who are having difficulty with mathematics. Observations, error pattern analysis, interviews, and other evaluation procedures are used to learn about elementary students’ mathematical abilities, and these assessments are used to plan for instruction. Corequisites: T&L 413 and T&L 486. F.

T&L 453. Methods and Materials: Kindergarten. 2 Credits.
Exploration of curriculum, methods, and materials for use in kindergarten settings. Prerequisites: Admission to Teacher Education Program and T&L 310. F,S,SS.

T&L 456. Early Childhood Ed Seminar. 1 Credit.
This seminar continues the exploration of curriculum, methods, and materials issues as they are presented in the particular of the student teaching experience. Prerequisites: T&L 333 and admission to Teacher Education Program. Corequisite: T&L 487. F,S.

T&L 465. Middle Level Curriculum and Methods. 5 Credits.
This methods course takes a hands-on approach to increasing understanding and application of the various methods and strategies for teaching early adolescent students. This course addresses techniques, strategies, materials, and a content area knowledge base necessary for promoting student learning and success in a middle school setting. Prerequisite: T&L 341. Corequisite: T&L 486. S.

T&L 470. Science in the Elementary School (TEAM). 3 Credits.
A survey of teaching strategies, materials, and resources appropriate for promoting science inquiry in elementary classrooms. Prerequisite: Admission to the Teacher Education program; see department for approval. F,S.

T&L 471. Physical Science in the Elementary School. 1-4 Credits.
Hands-on approach to learning basic physical science topics such as electricity, sound, light, and force. Effective teaching strategies are also emphasized. F,S.

T&L 472. Teaching Life Science in the Elementary School. 2 Credits.
Hands-on approach to learning basic biology topics such as cells, plants, animals, and ecosystems. Effective teaching strategies are also emphasized. F,S.

T&L 473. Earth and Space Science. 1-4 Credits.
Hands-on approach to learning basic earth and space science topics such as erosion, plate tectonics, water quality, pollution, astronomy, planets, and the solar system. Effective teaching strategies are emphasized. SS.

T&L 486. Field Experience. 1-4 Credits.
Supervised tutorial or apprentice teaching experience in an early childhood, K-12 classroom, university, or community setting approved by the program area. Prerequisite: Admission to the Teacher Education program. Repeatable to 16 credits. S/U grading. F,S.

T&L 487. Student Teaching. 4-16 Credits.
Provides student with the opportunity to assume the role of a classroom teacher in an educational setting under the supervision of a cooperating teacher and a University faculty member. Prerequisites: Permission of program, senior standing only. Prerequisite or Corequisite: T&L 488. Repeatable. S/U grading. F,S.

T&L 488. Senior Seminar. 1 Credit.
A discussion of problems, professional obligations, and careers in teaching. To be taken concurrently with or the semester prior to student teaching. Prerequisite: T&L 488 to be taken concurrently with or the semester prior to student teaching. S/U grading.

T&L 489. Senior Capstone: Responsive Teaching. 3 Credits.
Course is taken with student teaching. Teacher candidates engage in written communication and critical thinking in the context of student teaching. Course engagements require candidates to develop and implement curriculum and assessment; analyze and reflect on assessment results to respond to learners’ needs; and synthesize professional artifacts to demonstrate ability to plan, implement, assess and reflect on teaching and learning. Corequisite: Acceptance into Student Teaching. F,S.

T&L 493. Workshop. 1-4 Credits.
Special problems in Special Education; consideration of special problems of concern to the Special Education teacher and other educators. Repeatable to 8 credits. F,S.

T&L 495. Independent Study. 1-4 Credits.
This course is designed for the interested student’s pursuit of an area of study not offered through regular courses. In addition, students can continue to pursue subject matter covered in courses in greater depth. Repeatable to 8 credits.

T&L 498. Special Projects. 1-8 Credits.
Course number reserved for committee approved proposals, independent study, special colloquia, or experimental courses.

Bachelor of Science in Education in Secondary Education

Required 125 credits (36 of which must be numbered 300 or above, and 60 which must be from a 4-year institution) including:

I. Essential Studies Graduation Requirements (see University ES listing).

II. EHD General Graduation Requirements (see EHD listing).

III. The Following Curriculum:

Pre-Admission Courses

T&L 250 Introduction to Education 3
T&L 319 Integrating Diverse Needs in Educational Settings 3

Required Courses

T&L 339 Educational Technology 2
T&L 345 Curriculum, Instruction, and Assessment 3
T&L 350 Development and Education of the Adolescent (Secondary) 3
or T&L 252 Child Development 3
T&L 400 Methods and Materials 3
T&L 432 Learning Environments 3
T&L 433 Multicultural Education 3
T&L 486 Field Experience (Required co-requisite with T&L 400) 1-4
T&L 487 Student Teaching 16
T&L 488 Senior Seminar 1
T&L 489 Senior Capstone: Responsive Teaching (Required if no Discipline Capstone) 3

Total Credits 38-47

Bachelor of Science in Education with Composite Major in Social Studies

Required 125 credits (36 of which must be numbered 300 or above and 60 of which must be from a 4-year institution) including:

I. Essential Studies Graduation Requirements (see University ES listing).

II. EHD General Graduation Requirements (see EHD listing).

III. The Following Curriculum:

Course List

HIST 101 Western Civilization I 3
HIST 102 Western Civilization II 3
HIST 103 United States to 1877 3
HIST 104 United States since 1877 3
HIST 220 History of North Dakota 3
HIST elective 300 level or above 3
POLS 115 American Government I 3
POLS 116 State and Local Government 3
POLS 220 International Politics 3
Bachelor of Science in Education with Double Major in Elementary Education and Early Childhood

Required 125 credits (36 of which must be numbered 300 or above, and 60 of which must be from a 4-year institution) including:

I. Essential Studies Graduation Requirements (see University ES listing).

II. EHD General Graduation Requirements (see EHD listing).

III. Elementary Education Curriculum as listed above.

IV. The following Early Childhood Education Curriculum:

Select one of the following:

T&L 250  Introduction to Education  3
T&L 286  Field Experience  1
T&L 310  Introduction to Early Childhood Education  3
T&L 311  Observing and Assessing Children  3
T&L 313  Language Development and Emerging Literacy  3
T&L 330  Infant and Toddler  3
T&L 332  Administration and Leadership in Early Childhood Education  3
T&L 333  Methods and Materials: Pre-Kindergarten  3
T&L 336  Social and Emotional Development and Guidance of Children  3
T&L 338  Home, School and Community Relations  3
T&L 443  Mathematics for Primary Grades  2
T&L 453  Methods and Materials: Kindergarten  2
T&L 456  Early Childhood Ed Seminar  1
T&L 486  Field Experience  1
T&L 487  Student Teaching  13
T&L 489  Senior Capstone: Responsive Teaching  3

One elective course which deals with communication with adults, to be selected with adviser approval.

Total credits 37-39.

These requirements may be impacted by change at the federal and state level.

Bachelor of Science in Education with Double Major in Elementary and Middle Level Education

Required 125 credits (36 of which must be numbered 300 or above, and 60 of which must be from a 4-year institution) including:

I. Essential Studies Graduation Requirements (see University ES listing).

II. EHD General Graduation Requirements (see EHD listing).

III. Elementary Education Curriculum (see Elementary Education listing).

IV. The Following Middle Level Education (Grades 5-8) Curriculum:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>T&amp;L 339</td>
<td>Educational Technology</td>
<td>2</td>
</tr>
<tr>
<td>T&amp;L 341</td>
<td>Foundations of Middle Level Education</td>
<td>2</td>
</tr>
<tr>
<td>T&amp;L 350</td>
<td>Development and Education of the Adolescent</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 409</td>
<td>Reading in the Content Areas</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 465</td>
<td>Middle Level Curriculum and Methods</td>
<td>5</td>
</tr>
<tr>
<td>T&amp;L 486</td>
<td>Field Experience</td>
<td>1-4</td>
</tr>
<tr>
<td>T&amp;L 489</td>
<td>Senior Capstone: Responsive Teaching</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 250</td>
<td>Introduction to Education (Admission to the program is completed during this course)</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 252</td>
<td>Child Development</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 286</td>
<td>Field Experience</td>
<td>1</td>
</tr>
<tr>
<td>T&amp;L 315</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 328</td>
<td>Survey of Children's Literature</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 335</td>
<td>Understanding Readers and Writers</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 410</td>
<td>Teaching Reading in the Elementary School</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 417</td>
<td>Classroom (TEAM)</td>
<td></td>
</tr>
<tr>
<td>T&amp;L 430</td>
<td>Social Studies in the Elementary School (Team)</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 432</td>
<td>Learning Environments</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 433</td>
<td>Multicultural Education</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 440</td>
<td>Mathematics in Elementary School (Team)</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 470</td>
<td>Science in the Elementary School (TEAM)</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 487</td>
<td>Student Teaching</td>
<td>4-16</td>
</tr>
<tr>
<td>T&amp;L 488</td>
<td>Senior Seminar</td>
<td>1</td>
</tr>
</tbody>
</table>

Check with your advisor for your science and social studies requirements

V. Subject Matter Areas of Concentration

Note: To teach any one of the electives in North Dakota requires 6 credits in the subject.

Footnotes

Bachelor of Science in Education with Double Major in Elementary Education and Early Childhood
Students completing a double major in Elementary and Middle Level Education must take coursework in two content areas in addition to the Elementary and Middle Level major programs of study. These programs must be planned carefully between the student and the advisor in both programs of study to ensure that the requirements for teaching in the subject areas have been met. Examples of content areas include but are not limited to: English, mathematics, science, social studies, health, and technology education.

These requirements may be impacted by changes at the federal and state level. Middle level advisers have lists of courses that may be recommended or required in certain areas.

In this combined major program, courses in Middle Level Education fulfill elective requirements in Elementary Education.

Bachelor of Science in Education with Major in Early Childhood Education

Required 125 credits (36 of which must be numbered 300 or above, and 30 which must be from UND). Please see an Early Childhood academic adviser for the most accurate program planning.

I. Essential Studies Graduation Requirements (see University ES listing).

II. EHD General Graduation Requirements (see EHD listing).

A. Students admitted Fall 2019 and after are required to take the following:

Communications — 9 credits

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 110</td>
<td>College Composition I</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 130</td>
<td>Composition II: Writing for Public Audiences</td>
<td>3</td>
</tr>
<tr>
<td>COMM 110</td>
<td>Fundamentals of Public Speaking</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 9

Social Sciences — 9 credits

From 2 departments, including T&L 252 Child Development (required)

Arts and Humanities — 9 credits

From 2 departments

Math, Science, Technology — 9 credits

Must be taken in at least 3 departments, must include 1 science course with corresponding lab.

III. The following Early Childhood Education curriculum:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>T&amp;L 250</td>
<td>Introduction to Education</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 252</td>
<td>Child Development</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 251</td>
<td>Understanding Individuals with Different Abilities</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 310</td>
<td>Introduction to Early Childhood Education</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 311</td>
<td>Observing and Assessing Children</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 313</td>
<td>Language Development and Emerging Literacy</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 320</td>
<td>Infant and Toddler</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 322</td>
<td>Administration and Leadership in Early Childhood Education</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 333</td>
<td>Methods and Materials: Pre-Kindergarten</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 486</td>
<td>Field Experience (co-requisite to T&amp;L 333)</td>
<td>2</td>
</tr>
<tr>
<td>T&amp;L 335</td>
<td>Understanding Readers and Writers</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 336</td>
<td>Social and Emotional Development and Guidance of Children</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 338</td>
<td>Home, School and Community Relations</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 339</td>
<td>Educational Technology</td>
<td>2</td>
</tr>
<tr>
<td>T&amp;L 405</td>
<td>Data Literacy for Teachers</td>
<td>1</td>
</tr>
<tr>
<td>T&amp;L 411</td>
<td>Primary Reading and Language Arts</td>
<td>2</td>
</tr>
</tbody>
</table>

T&L 433 Multicultural Education 3
T&L 443 Mathematics for Primary Grades 2
T&L 453 Methods and Materials: Kindergarten 2
T&L 456 Early Childhood Ed Seminar 1
T&L 487 Student Teaching 8
T&L 413 Assessing and Correcting Reading Difficulties 2
T&L 444 Assessing and Correcting Mathematics Difficulties 2
T&L 518 Science in the Elementary School 3
T&L 519 Social Studies in the Elementary School 3
T&L 486 Field Experience taken with 518/519 one credit taken with 413/444 and one credit 2

T&L 487 Student Teaching 8
T&L 488 Senior Seminar 1
T&L 489 Senior Capstone: Responsive Teaching 3

Bachelor of Science in Education with Major in Elementary Education

Required 125 credits (36 of which must be numbered 300 or above, and 30 which must be from UND) including:

I. Essential Studies Requirements (see University ES listing).

II. EHD General Graduation Requirements (see EHD listing).

III. The Following Curriculum:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>T&amp;L 252</td>
<td>Child Development</td>
<td>3</td>
</tr>
<tr>
<td>or PSYC 250</td>
<td>Developmental Psychology</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 151</td>
<td>Human Geography</td>
<td>3</td>
</tr>
<tr>
<td>or GEOG 161</td>
<td>World Regional Geography</td>
<td>3</td>
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</table>

Set one of the following (History):

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>HIST 101</td>
<td>Western Civilization I</td>
<td>3</td>
</tr>
<tr>
<td>HIST 102</td>
<td>Western Civilization II</td>
<td>3</td>
</tr>
<tr>
<td>HIST 103</td>
<td>United States to 1877</td>
<td>3</td>
</tr>
<tr>
<td>HIST 104</td>
<td>United States since 1877</td>
<td>3</td>
</tr>
<tr>
<td>HIST 220</td>
<td>History of North Dakota</td>
<td>3</td>
</tr>
<tr>
<td>MATH 103</td>
<td>College Algebra</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 12

* A higher level math or qualify score on the math placement test may be substituted.

A. Science Requirement:

One science with corresponding lab

Additionally, students must take a science course in the following four science areas: physical, biological, earth, and space studies. This coursework may be selected from the Essential Studies course list or from T&L 400-level science courses. Note that T&L science courses count as elective courses in the major and cannot be applied towards Essential Studies graduation requirements.

IV. Minor or Specialty Area:

Each student must have a minor or specialty area consisting of 20 credits. Two courses or a maximum of six credits may be transferred from your Essential Studies to your minor or specialty area. Select from: Anthropology, Art, English Language Learner/Bilingual Education, Early Childhood Education, Economics, English, Fine Arts, Foreign Language, Geography, History, Indian Studies, Kindergarten Endorsement, Literacy Education, Mathematics, Middle School, Music, Physical Education, Political Science, Psychology, Science, Social Studies, Sociology, Special Education, Technology Education or Visual Arts.

V. Introductory Courses:
Bachelor of Science in Education with Major in Middle Level Education

Required 125 credits (36 of which must be numbered 300 or above) and 60 of which must be from a 4-year institution including:

I. Essential Studies Graduation Requirements (see University ES listing).

II. EHD General Graduation Requirements (see EHD listing).

III. The following Middle Level Education (Grades 5-8) Curriculum:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>T&amp;L 250</td>
<td>Introduction to Education</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 328</td>
<td>Survey of Children’s Literature</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 251</td>
<td>Understanding Individuals with Different Abilities</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits: 9


Requires 24 credits in each area of concentration: see the middle level adviser for required coursework.

In order to be considered a highly qualified teacher at the Middle Level, candidates must take coursework in two content areas in addition to the Middle Level major program of study. This program must be planned carefully between the student and the middle school advisor to ensure that the requirements for teaching in the subject areas have been met. Examples of content areas include but are not limited to: English, mathematics, science, social studies, health, and technology education.

*These requirements may be impacted by changes at the federal and state level.

Bachelor of Science in Education with Major in Science

Required 132 credits (36 of which must be numbered 300 or above and 60 of which must be from a 4-year institution) including:

I. Essential Studies Graduation Requirements (see University ES listing).

II. EHD General Graduation Requirements (see EHD listing).

III. The following Science Curriculum:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 115 &amp; 115L</td>
<td>Introductory Chemistry I and Introductory Chemistry Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 121 &amp; 121L</td>
<td>General Chemistry I and General Chemistry I Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 122 &amp; 122L</td>
<td>General Chemistry II and General Chemistry II Laboratory</td>
<td>4</td>
</tr>
</tbody>
</table>

OR

Chemistry Course List

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>T&amp;L 250</td>
<td>Introduction to Education</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 315</td>
<td>Integrating Diverse Needs in Educational Settings</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 339</td>
<td>Educational Technology</td>
<td>2</td>
</tr>
</tbody>
</table>

Admission to teacher education is required for enrollment in all of the following courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>T&amp;L 341</td>
<td>Foundations of Middle Level Education</td>
<td>2</td>
</tr>
<tr>
<td>T&amp;L 350</td>
<td>Development and Education of the Adolescent</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 409</td>
<td>Reading in the Content Areas</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 432</td>
<td>Learning Environments</td>
<td>3</td>
</tr>
</tbody>
</table>

T&L 433 Multicultural Education 3
T&L 465 Middle Level Curriculum and Methods 5
T&L 486 Field Experience 1-4

A minimum of two methods courses in each area of concentration (see below) from the secondary education program and corequisite field experience (8)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>T&amp;L 487</td>
<td>Student Teaching</td>
<td>13</td>
</tr>
<tr>
<td>T&amp;L 488</td>
<td>Senior Seminar</td>
<td>1</td>
</tr>
<tr>
<td>T&amp;L 489</td>
<td>Senior Capstone: Responsive Teaching</td>
<td>3</td>
</tr>
</tbody>
</table>

Course List

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 211</td>
<td>College Physics I</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 212</td>
<td>College Physics II</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 213</td>
<td>College Physics III</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 251</td>
<td>University Physics I (Students taking the University Physics I must take Calculus I)</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 252</td>
<td>University Physics II (Requires departmental /instructor approval to waive Calculus II)</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 253</td>
<td>University Physics III (Requires departmental / instructor approval to waive Calculus III)</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 121 &amp; 121L</td>
<td>General Chemistry I and General Chemistry I Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 122 &amp; 122L</td>
<td>General Chemistry II and General Chemistry II Laboratory</td>
<td>4</td>
</tr>
</tbody>
</table>
| OR
| CHEM 115 & 115L | Introductory Chemistry I and Introductory Chemistry Laboratory | 3       |
| CHEM 116 & 116L | Introduction to Organic and Biochemistry Laboratory | 3       |
Must take the following courses as part of 15 hours of required kindergarten coursework. In addition, they are required to student teach in a kindergarten classroom.

T&L 310  Introduction to Early Childhood Education  3
T&L 311  Observing and Assessing Children  3
T&L 313  Language Development and Emerging Literacy  3
T&L 338  Home, School and Community Relations  3
T&L 453  Methods and Materials: Kindergarten  2
T&L 487  Student Teaching  4-16

These requirements may be impacted by change at the federal and state level.

Minor in Early Childhood Education

21 credits including:

T&L 310  Introduction to Early Childhood Education  3
T&L 311  Observing and Assessing Children  3
T&L 313  Language Development and Emerging Literacy  3
T&L 320  Infant and Toddler  3
T&L 333  Methods and Materials: Pre-Kindergarten  3
T&L 338  Home, School and Community Relations  3
T&L 453  Methods and Materials: Kindergarten  2
T&L 486  Field Experience  1

Total Credits  21

Minor in Literacy Education

The Literacy Education minor is open to students majoring in a field which leads to teacher certification at the early childhood, elementary, middle or secondary level. Students must be admitted to the Teacher Education program. The program consists of 20 credits, which includes related courses.

Students who complete the Literacy Education minor are eligible to apply for the North Dakota Reading Credential, which enables teachers to work as reading specialists at one of the following levels in North Dakota: K-6 (Elem or Elem/ECE double majors), 5-8 (Elem and Secondary with MLE minor or MLE major), 7-12 (Generalist Credential for English, Social Studies or Science majors). NOTE: in North Dakota there is no Early Childhood Reading Credential. The coursework meets the requirements for the North Dakota Reading Credential.

Note: All courses completed for the minor must be taken in addition to those taken for the major. It is recommended that all students pursuing this minor complete T&L 335 Understanding Readers and Writers early in the course sequence as it is a prerequisite for more advanced reading courses.

Required Courses for the Elementary Education Major and Early Childhood/Elementary Education Double Major (20 credits):

T&L 319  Integrating Diverse Needs in Educational Settings (Fall & Spring)  3
T&L 409  Reading in the Content Areas (Spring)  3
T&L 413  Assessing and Correcting Reading Difficulties (Summer)  2
T&L 414  Corrective Reading Practicum (Summer)  2
T&L 415  Language and Literacy Development of English Language Learners (Spring)  3

Select three of the following:

T&L 313  Language Development and Emerging Literacy (Fall)  7
T&L 411  Primary Reading and Language Arts (Fall & Spring - Elementary only)  7
T&L 416  Adolescent Literacy Development (Fall)  7
T&L 486  Field Experience (in Literacy or ESL)  7
T&L 329  Young Adult Literature  7

English Language Learner or Bilingual Education Endorsement

Students who complete the courses listed below will be eligible for North Dakota endorsement in English Language Learner (ELL) or Bilingual Education. Students must be certified to teach in Elementary, Middle Level or Secondary classrooms.

T&L 415  Language and Literacy Development of English Language Learners  3
T&L 433  Multicultural Education  3
T&L 486  Field Experience  1-4
ENGL 209  Introduction to Linguistics  3
ENGL 309  Modern Grammar  3
ENGL 370  Language and Culture  3
ENGL 418  Second Language Acquisition  3
ENGL 419  Teaching English as a Second Language  3

The bilingual education endorsement requires proficiency in the language of instruction. These requirements may be impacted by change at the federal and state level.

Kindergarten Endorsement

Undergraduate students who wish a Kindergarten Endorsement but do not wish to complete the double major in elementary and early childhood education must take the following courses as part of 15 hours of required kindergarten coursework.

T&L 301  Introduction to Early Childhood Education  3
T&L 311  Observing and Assessing Children  3
T&L 313  Language Development and Emerging Literacy  3
T&L 338  Home, School and Community Relations  3
T&L 453  Methods and Materials: Kindergarten  2
T&L 487  Student Teaching  4-16
Minor in Middle Level Education

The Middle Level minor is open to students majoring in a field which leads to teacher licensure at the elementary or secondary level.

The following Middle Level Education (Grades 5-8) Curriculum is required (23 credits):

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>T&amp;L 315</td>
<td>Educational Technology</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 339</td>
<td>Foundations of Middle Level Education</td>
<td>2</td>
</tr>
<tr>
<td>T&amp;L 341</td>
<td>Development and Education of the Adolescent</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 409</td>
<td>Reading in the Content Areas</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 433</td>
<td>Multicultural Education</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 465</td>
<td>Middle Level Curriculum and Methods</td>
<td>5</td>
</tr>
<tr>
<td>T&amp;L 486</td>
<td>Field Experience</td>
<td>1-4</td>
</tr>
<tr>
<td>T&amp;L 489</td>
<td>Senior Capstone: Responsive Teaching</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 25-28

Students completing the Middle Level minor with a major in Elementary Education have exceeded the endorsement requirement for a highly qualified teacher (grade 7 or 8). Although, Elementary Education majors with a Middle Level minor will need to complete a major equivalence in a core academic subject. Students are encouraged to meet with the middle school adviser to ensure that the requirements for teaching in the middle school have been met.

Students completing the Middle School minor with a major in a Secondary Education academic area will be considered highly qualified in that core content area.

* These requirements may be impacted by changes at the federal and state level.

Minor in Special Education

The following courses are required for the special education minor (20 credits):

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>T&amp;L 251</td>
<td>Understanding Individuals with Different Abilities</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 316</td>
<td>Behavioral Assessment and Tiered Supports in Education</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 319</td>
<td>Integrating Diverse Needs in Educational Settings</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 423</td>
<td>Assessment and Individualized Planning in Special Education</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 413</td>
<td>Assessing and Correcting Reading Difficulties (Coreqs T&amp;L 444 and T&amp;L 486)</td>
<td>2</td>
</tr>
<tr>
<td>T&amp;L 444</td>
<td>Assessing and Correcting Mathematics Difficulties (Coreqs T&amp;L 413 and T&amp;L 486)</td>
<td>2</td>
</tr>
<tr>
<td>T&amp;L 486</td>
<td>Field Experience</td>
<td>1-4</td>
</tr>
<tr>
<td>SPED 525</td>
<td>Legal/Ethical Aspects in Special Education (Senior Status Required)</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 23-28

Secondary Education Licensure

Required 125 credits (36 of which must be numbered 300 or above, and 60 which must be from a 4-year institution) including:

I. Essential Studies Graduation Requirements (see University ES listing).

II. EHD General Graduation Requirements (see EHD listing).

III. The Following Curriculum:

Pre-Admission Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>T&amp;L 250</td>
<td>Introduction to Education</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 319</td>
<td>Integrating Diverse Needs in Educational Settings</td>
<td>3</td>
</tr>
</tbody>
</table>

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>T&amp;L 339</td>
<td>Educational Technology</td>
<td>2</td>
</tr>
<tr>
<td>T&amp;L 345</td>
<td>Curriculum, Instruction, and Assessment</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 350</td>
<td>Development and Education of the Adolescent (Secondary)</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 252</td>
<td>Child Development</td>
<td>2</td>
</tr>
<tr>
<td>T&amp;L 400</td>
<td>Methods and Materials</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 432</td>
<td>Learning Environments</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 433</td>
<td>Multicultural Education</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 486</td>
<td>Field Experience (Required co-requisite with T&amp;L 400)</td>
<td>1-4</td>
</tr>
<tr>
<td>T&amp;L 487</td>
<td>Student Teaching</td>
<td>16</td>
</tr>
<tr>
<td>T&amp;L 488</td>
<td>Senior Seminar</td>
<td>1</td>
</tr>
<tr>
<td>T&amp;L 489</td>
<td>Senior Capstone: Responsive Teaching (Required if no Discipline Capstone)</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 38-47

Theatre Arts (Thea)

B.F.A. in Musical Theatre with a Major in Theatre Arts (p. 216)

B.A. with a Major in Theatre Arts (p. 216)

Minor in Theatre Arts (p. 217)

Minor in Dance (p. 217)

Courses

THEA 110. Introduction to Theatre Arts. 3 Credits.

Basic orientation and historical perspective to theatre arts. Study of the roles of playwright, director, actor, designer, producer, and audience members in current theatre practice. Course will include attendance at area performances. Course includes 16 hours of experiential work in scene/costume shop or on a production. F.S.
THEA 120. Voice and Movement I. 2 Credits.
Development of the student's physical and vocal awareness. Emphasis on freeing the actor and identifying personal habitual response patterns. F, odd years.

THEA 161. Acting I. 3 Credits.
Basic principles of acting with emphasis on movement; basic character development through improvisation and script. F.S.

THEA 201. Theatre Practicum. 1 Credit.
Participation in theatre pre-performance and performance capacities, both technical and acting, under faculty direction. Repeatable to 8 hours. Repeatable to 8 credits. F.S.

THEA 204. Introduction to Acting for Musical Theatre. 3 Credits.
An introduction to the unique style of performance techniques for musical theatre including voice and movement work, acting, and staging. Prerequisite: THEA 161. F, even years.

THEA 210. Selected Topics in Theatre. 1-3 Credits.
Topics of special interest to faculty and students, such as Stage Management, and others. Repeatable up to 9 credits. Repeatable to 9 credits. On demand.

THEA 220. Voice and Movement II. 2 Credits.
A sequential continuation of Theatre 120: Voice and Movement I with focus on freeing the channel for sound, improving range, and articulation. Emphasis in movement will be on posture and introducing somatic techniques. Prerequisite: THEA 120 or consent of instructor. S, even years.

THEA 225. Makeup for the Stage. 3 Credits.
Introduction to the basic techniques of makeup for the stage design and application. F.

THEA 230. Text Analysis. 3 Credits.
An analysis of the dramatic text from the standpoint of production and performance. Prerequisites: THEA 110 or THEA 130. S, odd years.

THEA 240. Ballet I. 2 Credits.
An introductory ballet class designed to introduce students to the fundamentals of ballet. This class will contain a ballet barre, warm-up, barre stretch, an adagio center combination and floor exercises designed to enhance alignment, flexibility, strength and center. Repeatable to 6 credits. F.

THEA 241. Jazz Dance I. 2 Credits.
This course is designed to introduce the student to principles and techniques characteristic of jazz dance. Students will execute movement combinations in a variety of jazz styles. Emphasis will be placed on movement fundamentals of alignment, flexibility, endurance, dynamic range, and strength. Repeatable to 6 credits. F, odd years.

THEA 242. Tap Dance. 1 Credit.
This class is designed to introduce the student to the basic principles of tap dance. Warm-up, exercises, and combinations in tap technique will provide opportunities for the student to develop an efficient use of weight, alignment, articulation of footwork, coordination, and musicality. Repeatable to 4 credits. F, even years.

THEA 243. Contemporary Dance I. 2 Credits.
Introduction to the elements of contemporary dance and practice of the fundamentals of the technique with attention given to both the art and craft of the dance form. Emphasis on postural alignment, shape, sequence, flexibility, as well as the body in relation to space, time, force, and movement initiation. Repeatable to 6 credits. F.

THEA 250. Readings in Dramatic Literature. 3 Credits.
Readings in dramatic literature from ancient to contemporary, with a strong emphasis on written and verbal analysis of realist texts. On demand.

THEA 260. Costume Craft. 3 Credits.
An introduction to the basic principles, theory, and techniques of costume construction. This hands-on class will reach from basic to advanced skills. S, odd years.

THEA 270. Stagecraft. 3 Credits.
This course is intended to teach the basic functions, aesthetics, history, methods and materials of scenery, properties, lighting and sound. Practical experience, shop procedures are tied to hands-on experience in departmental productions. F.

THEA 271. Intermediate Acting I: The Actor in You. 3 Credits.
An introduction to the Meisner Technique and to scene study. Special emphasis will be placed on using and trusting yourself to inform your work, working together, and applying rehearsal techniques to scripted work. Prerequisite: THEA 161 or consent of instructor. F, odd years.

THEA 300. Play Direction I. 3 Credits.
Principles and techniques of directing for the theatre. Student laboratory directing experiences. Prerequisites: THEA 161 and THEA 230. F, odd years.

THEA 326. Lighting for Stage. 3 Credits.
The principles, mechanics and design of stage and lighting; its relationship to set, makeup and costume design; plus laboratory participation in University productions. Prerequisite: THEA 270 or consent of instructor. Repeatable to 6 credits. S, odd years.

THEA 330. Contemporary Theatre. 3 Credits.
Readings in dramatic literature from 1890s to contemporary times. Strong emphasis on written and verbal analysis of current dramatic techniques beyond realism. S, odd years.

THEA 335. Stage Management. 3 Credits.
An introduction to the procedures, responsibilities, and best practices for stage management. F.

THEA 339. Production Design. 3 Credits.
Exploration of needs for putting together a successful theatrical production. Topics include conceptual work, drafting, model-making and rendering, and scenic painting. Prerequisites: THEA 270 and THEA 300 or consent of instructor. Repeatable to 6 credits. F, odd years.

THEA 340. Ballet II. 2 Credits.
Ballet II is a continuation of Ballet I. Students will continue to develop advanced ballet skills and technique in relationship to form, strength, flexibility, center, line, choreography and physical expression. Prerequisite: THEA 240 or consent of instructor. Repeatable to 6 credits. S.

THEA 341. Jazz Dance II. 2 Credits.
This course is designed to be a continuation of THEA 241. Students continue to explore the principles and techniques characteristic of jazz dance through a variety of jazz dance styles. Emphasis will be placed on applying efficient form and dynamic energy to intermediate level movement combinations in center and across the floor. Prerequisites: THEA 241. Repeatable to 6 credits. S.

THEA 342. Contemporary Dance II. 2 Credits.
In this course students will continue to refine the skills learned in Contemporary Dance I and explore the principles and techniques characteristic of contemporary dance. Emphasis will be placed on correct alignment, spatial awareness, musicality, and dynamic energy as applied to intermediate level movement combinations. Prerequisite: THEA 243 or consent of instructor. Repeatable to 6 credits. S.

THEA 344. Musical Theatre Dance Style. 2 Credits.
In this course students will learn the vocabulary, styles, and techniques associated with musical theatre dance. Building upon the movement basics learned in the prerequisite courses, students will refine their dance skills and increase their knowledge base through the practice and assimilation of repertoire from the classic musical theatre. Prerequisite: THEA 241 or consent of instructor. F, odd years.

THEA 371. Advanced Acting: Advanced Scene Study. 3 Credits.
Advanced script analysis applied to plays that place advanced demands on the actor. Prerequisites: THEA 272 or consent of instructor. F.

THEA 397. Cooperative Education. 1-6 Credits.
A practical work experience with an employer closely associated with the student’s academic area. Arranged by mutual agreement among student, department, and employer. Repeatable to 12 credits. Prerequisites: GPA of 2.5 and junior standing. Repeatable to 12 credits. F,S,SS.

THEA 401. Theatre Study Abroad. 3 Credits.
This course is designed in conjunction with a study abroad trip. Students will research the impact of theatre in the designated region. Locations for the study abroad trip will vary. Repeatable to 12 credits. S.

THEA 404. Acting for the Music Theatre. 3 Credits.
Appreciation of and performance techniques for musical theatre including: voice and movement work, acting, and staging. Prerequisite: Consent of instructor. S, odd years.
III. Selection of a Subplan from either Acting, Design/Tech, or Generalist

II. 28 credits in the Theatre Core for all BA students

Capstone requirement.) 39 cr.

Required 120 credits (36 of which must be numbered 300 or above, and 30 of which must be from UND) including:

THEA 415. Selected Problems in Theatre Arts. 1-3 Credits.
Topics of special interest to faculty and students, such as Theatre Management, Women's Issues in Drama, Polish Theatre and Drama, Improvisation, Scene Painting, and others. Repeatable up to 9 credits.

THEA 421. History of Period Styles for Theatrical Design. 3 Credits.
A survey of period styles focusing on developments such as clothing and architecture from the Greek period to the present. An emphasis is placed on the research process for theatrical design. S, even years.

THEA 423. History of the Theatre: Classical, Medieval and Renaissance. 3 Credits.
The theatre in performance. The origins of theatrical forms and their relationships to acting style, physical theatre and audience with the cultural environment. F, even years.

THEA 424. History of the Theatre: Seventeenth Century to the Present. 3 Credits.
A continuation of topics covered in THEA 423 beginning with the Seventeenth Century and continuing to the present. Student need not take THEA 423 prior to enrolling in THEA 424. S, odd years.

THEA 425. Play Direction II. 3 Credits.
A continuation of THEA 300 with emphasis on contemporary theories, analysis, research, conceptualization, and implementation. Laboratory experience.
Prerequisite: THEA 300 or consent of instructor. S, even years.

THEA 426. Scene Design for the Stage. 3 Credits.
The analysis, research, and conceptualization of the physical context of theatre productions. Emphasis on individual creative projects. Repeatable up to 6 hours. Prerequisite: THEA 270. Repeatable to 6 credits. F.

THEA 427. Costume Design. 3 Credits.
Elements, principles, and styles of design applied to the visual creation of a dramatic character. Repeatable up to 6 credits. Prerequisites: THEA 260 or consent of instructor. Repeatable to 6 credits. S, even years.

THEA 442. Choreography. 3 Credits.
An introduction to choreography that offers the student training in the sequential application of basic principles of movement and form to a small group of dancers. Prerequisites: THEA 342 or consent of instructor. S, odd years.

THEA 450. Musical Theatre History. 3 Credits.
A survey of the history of musical theatre in performance, genre and world presence. Prerequisite: THEA 204. F, even years.

THEA 471. Advanced Acting III: Shakespeare. 3 Credits.

THEA 481. Theatre Practicum. 1-2 Credits.
Projects in all areas of theatre and interpretation in a supervisory capacity. Specific assignments in production/planning with faculty approval. Repeatable to 8 hours. Repeatable to 8 credits. F.S.

THEA 488. Playwriting. 3 Credits.
The playwright's problems as revealed through practice of writing plays; experimental productions of the student's creative work whenever possible. Repeatable to 6 hours. Prerequisite: Sufficient background in theatrical arts and creative writing and consent of instructor. Repeatable to 6 credits. F, odd years.

THEA 494. Senior Project. 4 Credits.
Individual work in an approved area. Prerequisite: Theatre BA or BFA students only. F.S.

Bachelor of Arts with Major in Theatre Arts

Required 120 credits (36 of which must be numbered 300 or above, and 30 of which must be from UND) including:

I. Essential Studies Requirements (Thea 424 fulfills the Essential Studies Capstone requirement.) 39 cr.

II. 28 credits in the Theatre Core for all BA students

III. Selection of a Subplan from either Acting, Design/Tech, or Generalist

IV. The following curriculum:
28 credits, including:

THEATRE CORE
All BA Theatre Students Must Complete the Following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>THEA 110</td>
<td>Introduction to Theatre Arts</td>
<td>3</td>
</tr>
<tr>
<td>THEA 161</td>
<td>Acting I</td>
<td>3</td>
</tr>
<tr>
<td>THEA 201</td>
<td>Theatre Practicum</td>
<td>1</td>
</tr>
<tr>
<td>THEA 225</td>
<td>Makeup for the Stage</td>
<td>3</td>
</tr>
<tr>
<td>THEA 230</td>
<td>Text Analysis</td>
<td>3</td>
</tr>
<tr>
<td>THEA 270</td>
<td>Stagecraft</td>
<td>3</td>
</tr>
<tr>
<td>THEA 300</td>
<td>Play Direction I</td>
<td>3</td>
</tr>
<tr>
<td>or THEA 335</td>
<td>Stage Management</td>
<td>3</td>
</tr>
</tbody>
</table>

THEA 330. Contemporary Theatre 3

THEA 423. History of the Theatre: Classical, Medieval and Renaissance 3

THEA 424. History of the Theatre: Seventeenth Century to the Present 3

Students Select One of the Following Subplans:

Acting Subplan

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>THEA 271</td>
<td>Intermediate Acting I: The Actor in You</td>
<td>3</td>
</tr>
<tr>
<td>THEA 371</td>
<td>Advanced Acting: Advanced Scene Study</td>
<td>3</td>
</tr>
<tr>
<td>THEA 120</td>
<td>Voice and Movement I</td>
<td>2</td>
</tr>
<tr>
<td>THEA 220</td>
<td>Voice and Movement II</td>
<td>2</td>
</tr>
<tr>
<td>THEA 204</td>
<td>Introduction to Acting for Musical Theatre</td>
<td>3</td>
</tr>
<tr>
<td>THEA 471</td>
<td>Advanced Acting III: Shakespeare</td>
<td>3</td>
</tr>
</tbody>
</table>

Design/Tech Subplan

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>THEA 427</td>
<td>Costume Design</td>
<td>3</td>
</tr>
<tr>
<td>THEA 426</td>
<td>Scene Design for the Stage</td>
<td>3</td>
</tr>
<tr>
<td>THEA 326</td>
<td>Lighting for Stage</td>
<td>3</td>
</tr>
<tr>
<td>THEA 260</td>
<td>Costume Craft</td>
<td>3</td>
</tr>
<tr>
<td>THEA 201</td>
<td>Theatre Practicum</td>
<td>1</td>
</tr>
<tr>
<td>THEA 339</td>
<td>Production Design</td>
<td>3</td>
</tr>
<tr>
<td>THEA 421</td>
<td>History of Period Styles for Theatrical Design</td>
<td>3</td>
</tr>
</tbody>
</table>

Generalist Subplan

Level II Proficiency in a Foreign Language

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>THEA 300</td>
<td>Play Direction I (Generalists are required to take THEA 300 AND THEA 335)</td>
<td>3</td>
</tr>
<tr>
<td>or THEA 335</td>
<td>Stage Management</td>
<td>3</td>
</tr>
<tr>
<td>THEA 201</td>
<td>Theatre Practicum (1 credit, to be repeated for 2 credits)</td>
<td>2</td>
</tr>
<tr>
<td>THEA 425</td>
<td>Play Direction II</td>
<td>3</td>
</tr>
<tr>
<td>THEA 488</td>
<td>Playwriting</td>
<td>3</td>
</tr>
</tbody>
</table>

Bachelor of Fine Arts in Musical Theatre with Major in Theatre Arts

Required 120 credits (36 of which must be numbered 300 or above, and 60 of which must be from a 4-year institution) including:

I. Essential Studies Requirements (See University ES listing): 39 credit hours

II. The Following Curriculum:

Major Requirements

Music Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUSC 101</td>
<td>Fundamentals of Music</td>
<td>3</td>
</tr>
<tr>
<td>or MUSC 130</td>
<td>Music Theory I</td>
<td>1</td>
</tr>
<tr>
<td>MUSC 133</td>
<td>Keyboard Skills I</td>
<td>1</td>
</tr>
<tr>
<td>Choral Ensemble (audition required)</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Individual Lessons (taken every semester)*</td>
<td></td>
<td>16</td>
</tr>
</tbody>
</table>

Theatre Courses
Minor in Theatre Arts

Required 25 credits, including:

THEA 110 Introduction to Theatre Arts 3
THEA 161 Acting I 3
THEA 201 Theatre Practicum 1
THEA 330 Contemporary Theatre 3
Select one of the following:

THEA 260 Costume Craft 3
THEA 270 Stagecraft 3
Select one of the following:

THEA 300 Play Direction I 3
THEA 335 Stage Management 3
Select one of the following:

THEA 423 History of the Theatre: Classical, Medieval and Renaissance 3
THEA 424 History of the Theatre: Seventeenth Century to the Present 3
Select two of the following: 6

THEA 225 Makeup for the Stage 3
THEA 230 Text Analysis 3
THEA 271 Intermediate Acting I: The Actor in You 3
THEA 326 Lighting for Stage 2
THEA 425 Play Direction II 3
THEA 426 Scene Design for the Stage 3
THEA 427 Costume Design 3
THEA 488 Playwriting 3

Total Credits 25

University Courses (UNIV)

Courses

UNIV 101. Introduction to University Life. 2 Credits.
This course is designed to promote the personal and academic success of new students. This course covers all facets of student transition to University Life including academic success, intellectual skill development, personal growth, wellbeing, intercultural skills, and connections across the University with peers, faculty, staff, and advisors. This course aims to help students develop skills that will ensure their success at UND. Prerequisite: Freshman Only. F.

UNIV 110. First Year Seminar. 3 Credits.
This seminar course is specifically meant to help first-year students make a successful transition to college, and has been designed to engage students in the academic life of the university through the study of a topic or theme. To accomplish these goals, students in this course will consider and practice being reflective about their own learning, being an active and engaged learner, and studying effectively. Only students in their first year at UND may register for this course. Prerequisite: Only students in their first year at UND may register for this course. On demand.

UNIV 115. First Year Research. 3 Credits.
This course is specifically meant to help first-year students make a successful transition to college, and has been designed to engage students in the academic life of the university through an intensive research experience. To accomplish these goals, students in this course will consider and practice being reflective about their own learning, being an active and engaged learner, and studying effectively. Only students in their first year at UND may register for this course. Prerequisite: Only students in their first year at UND may register for this course. On demand.

Minor in Dance

Required 20 credits, including:

Select six of the following (Dance Technique): 12

THEA 240 Ballet I
THEA 241 Jazz Dance I
THEA 242 Tap Dance
THEA 243 Contemporary Dance I
THEA 340 Ballet II
THEA 341 Jazz Dance II
THEA 342 Contemporary Dance II
THEA 344 Musical Theatre Dance Style
& THEA 161 Acting I
THEA 442 Choreography

Select two of the following: 2

THEA 201 Theatre Practicum

Additional technique class/classes

* Course number for individual lessons determined at registration.
UNIV 125. Introduction to Effective Study Skills. 2 Credits.
This course explores issues relevant to both a student's academic and personal lives. As its name implies, a large portion of this course is devoted to effective study skills and habits. The course examines various aspects of learning styles, studying skills, test taking strategies, etc. This information is helpful in assisting students to succeed. (A maximum total of 2 credits from UNIV 125, UNIV 126, and UNIV 127 may be counted toward degree requirements.) Academic issues involving this course will be handled through the College of Arts and Sciences. F.S.

UNIV 126. College Reading. 2 Credits.
This course is designed to assist college students progress from a pre-college reading level to a college reading level. It also presents a systematic way of approaching college textbook material that can help students to become more efficient in study skills integral to their college success. Comprehension skills will be introduced early in the course and integrated throughout the class. The exercises prepare students to read a selection and give them an opportunity to apply comprehension and study skills during and after reading. (A maximum total of 2 credits from UNIV 125, UNIV 126, and UNIV 127 may be counted toward degree requirements.) Academic issues involving this course will be handled through the College of Arts and Sciences. F.S.

UNIV 127. Critical Thinking Strategies for College. 2 Credits.
This course is designed for students who want to develop and improve advanced academic techniques, to successfully engage in active learning through critical thinking, metacognitive skills, acquire learning attitudes, and prepare for success in academics and the workplace environment. (A maximum total of 2 credits from UNIV 125, UNIV 126, and UNIV 127 may be counted toward degree requirements.) Academic issues involving this course will be handled through the College of Arts and Sciences. F.S.

UNIV 228. Non-UND Affiliated Study Abroad.
Course required of students studying abroad to maintain student status; required Sophomore status and cumulative GPA of 2.50; prior to registration, students will be involved in study abroad procedures inclusive of study abroad application, pre-departure orientation, credit transfer, and related study abroad processes outlined in the Study Abroad Handbook; courses to be taken during the study abroad semester must have pre-approval of appropriate academic department, and courses and grades earned are entered as transfer credit upon transfer back to UND (repeatable with permission of the student’s academic department). Academic issues involving this course will be handled through the College of Arts and Sciences. Repeatable. F.S.SS.

UNIV 229. Study Abroad.
1 to 12 credit equivalents in any one semester (repeatable with permission of the student’s academic department); course required of students studying abroad to maintain full-time status; required Sophomore status and cumulative GPA of 2.50; prior to registration, students will be involved in study abroad procedures inclusive of study abroad application, pre-departure orientation, credit transfer, and related study abroad processes outlined in the Study Abroad Handbook; courses to be taken during the study abroad semester must have pre-approval of appropriate academic department, and courses and grades earned are entered as transfer credit upon transfer back to UND. Academic issues involving this course will be handled through the College of Arts and Sciences. Prerequisites: Sophomore status and a cumulative GPA of 2.5. Repeatable. F.S.SS.

UNIV 401. Design Thinking for Social Innovation. 3 Credits.
This course will explore human-centered design, a creative problem solving model used to simplify complex challenges. Human-centered design process consists of steps such as: empathy, defining the problem, ideation, prototyping and testing, and reframing. Students will learn this process using a combination of academic and applied lessons in an interdisciplinary group of students. Completion of this course prepares students for design thinking and innovation professional certification by the International Association of Innovation Professionals (IAIOP). Passage of the course and the certification exams further prepares students for an internship opportunity through the UND Innovation Studio where interdisciplinary teams will use the human centered design process with an industry partner to collaborate on solving a complex, industry-specific challenge they are facing. F.S.

UNIV 410. Design Thinking Internship. 1-3 Credits.
The UND Innovation Studio identifies an interdisciplinary student team to work alongside an industry partner to identify new solutions and/or help support implementation of new solution to solve a complex, industry-specific challenge. Students participating in the studio internship will have successfully completed a design thinking training course and passed a certification exam with the International Association of Innovation Professionals. The studio internship experience is designed so students apply the innovation process through real-world application of their design thinking training to address a current industry challenge. Upon completion of this experience, students will have developed a stronger understanding of their creative problem solving abilities, refined their communication and collaboration skills, and have an assessment of their strengths and weaknesses as an innovative young professional. Prerequisite: UNIV 401 or by permission. Repeatable to 9 credits. S/U grading. F.S.SS.

Women and Gender Studies (WGS)
B.G.S. in Women & Gender Studies (p. 218)
Minor in Women and Gender Studies (p. 219)

Courses
WGS 200. Introduction to Gender Studies. 3 Credits.
An introduction to the social construction of gender, a concept that underlies research in women studies and the new masculinity studies—indeed, of much work in the humanities and social sciences, generally. Topics may include the role of gender in the formation of human symbol systems and institutions worldwide, as well its capacity to shape individual bodies, identities, and kinship relations. F.S.

WGS 225. The Study of Women. 3 Credits.
An introduction to the study of women as subjects of scholarly inquiry, with emphasis on transnational feminism and assessments of women's contributions around the globe. The course will provide an interdisciplinary focus on the central issues and questions posed by the new scholarship on women, and introduce students to the perspectives and methodologies of a variety of disciplines. F.S.

WGS 480. Feminist Theory. 3 Credits.
Feminist theory examines the foundations of American feminism from enlightenment liberal to postmodern and standpoint theories. The course first develops then critiques these fundamental approaches. Opportunities are provided to integrate mainstream and marginal experiences of feminist theory and its practice. Prerequisites: WGS 200 or WGS 225. On demand.

WGS 492. Senior Study: Women and Gender Studies. 1-4 Credits.
Supervised independent study involving a theory paper, practicum experience, or a combination of the two. Prerequisites: WGS 200 or WGS 225. On demand.

Bachelor of General Studies: Women and Gender Studies

Major in Interdisciplinary Studies: Women and Gender Studies
I. Essential Studies Requirements (see University ES listing).

II. A minimum of 36 credits, including 9 required WGS course credits (WGS 200, WGS 225, WGS 480) and 27 elective credits (list below is not all-inclusive of elective possibilities). Please consult Women and Gender Studies Director to confirm plan of study:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>WGS 200</td>
<td>Introduction to Gender Studies ((required))</td>
<td>3</td>
</tr>
<tr>
<td>WGS 225</td>
<td>The Study of Women ((required))</td>
<td>3</td>
</tr>
<tr>
<td>WGS 480</td>
<td>Feminist Theory ((required))</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 372</td>
<td>Culture Theory</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 375</td>
<td>Women in Prehistory</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 357</td>
<td>Women Writers and Readers (repeatable when topics vary)</td>
<td>3</td>
</tr>
<tr>
<td>CJ 302</td>
<td>Women, Crime, and Criminal Justice</td>
<td>3</td>
</tr>
</tbody>
</table>
Minor in Women & Gender Studies

Twenty credits of courses in Women and Gender Studies completed with a GPA of at least 2.0 are required for the minor.

I. Required courses (total credits 9):

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>WGS 200</td>
<td>Introduction to Gender Studies</td>
<td>3</td>
</tr>
<tr>
<td>WGS 225</td>
<td>The Study of Women</td>
<td>3</td>
</tr>
<tr>
<td>WGS 480</td>
<td>Feminist Theory</td>
<td>3</td>
</tr>
</tbody>
</table>

II. At least three of the following (total credits 11):

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 357</td>
<td>Women Writers and Readers ((may be repeated once when topics vary)</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 365</td>
<td>Psychology of Women</td>
<td>3</td>
</tr>
<tr>
<td>HIST 333</td>
<td>Women in Modern America</td>
<td>3</td>
</tr>
<tr>
<td>RELS 216</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>SOC 340</td>
<td>Sociology of Gender</td>
<td>3</td>
</tr>
<tr>
<td>COMM 310</td>
<td>Media and Diversity</td>
<td>3</td>
</tr>
<tr>
<td>CJ 361</td>
<td>Victimology</td>
<td>3</td>
</tr>
<tr>
<td>IS 346</td>
<td>Gender in American Indian Cultures</td>
<td>3</td>
</tr>
<tr>
<td>SOC 335</td>
<td>Families in a Changing Society</td>
<td>3</td>
</tr>
<tr>
<td>POLS 351</td>
<td>Women and Politics</td>
<td>3</td>
</tr>
<tr>
<td>WGS 492</td>
<td>Senior Study: Women and Gender Studies</td>
<td>1-4</td>
</tr>
</tbody>
</table>

Students may declare a major or minor through the College of Arts and Sciences and should also contact the Director of Women and Gender Studies to design a program of study.
Four Year Plans

Four-year plans are designed to help full-time degree-seeking undergraduate students to determine the best way to select a major and progress through coursework required to complete their bachelor’s degree.

Students are encouraged to review their major’s four-year plan, and to work with their academic advisor to ensure they meet the degree requirements, can plan for distinctive education engagement experiences such as internships, and successfully complete their program of study for graduation.

Four-year plans:
- Specify degree requirements for each major
- Provide semester-based course schedule models to complete in four years
- Incorporate Essential Studies and elective course requirement progressions
- Allow departments and advisors to create graduation progression benchmarks and review progress with student

The plans for each major can be found for each of the colleges and schools. Please use the links in the left navigation.

College of Arts and Sciences

<table>
<thead>
<tr>
<th>Major</th>
<th>p.</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.A. with Major in American Indian Studies</td>
<td>220</td>
</tr>
<tr>
<td>B.A. with Major in Anthropology</td>
<td>222</td>
</tr>
<tr>
<td>B.S. with Major in Biology</td>
<td></td>
</tr>
<tr>
<td>B.S. in Chemistry</td>
<td></td>
</tr>
<tr>
<td>B.S. with Major in Chemistry</td>
<td></td>
</tr>
<tr>
<td>B.A. with Major in Communication</td>
<td></td>
</tr>
<tr>
<td>B.A. with Major in Communication Sciences and Disorders</td>
<td>229</td>
</tr>
<tr>
<td>B.S. in Criminal Justice Studies</td>
<td></td>
</tr>
<tr>
<td>B.A. with Major in Economics</td>
<td></td>
</tr>
<tr>
<td>B.A. with Major in English</td>
<td></td>
</tr>
<tr>
<td>B.A. or B.S. with Major in Environmental Studies</td>
<td></td>
</tr>
<tr>
<td>B.S. with Major in Forensic Science</td>
<td></td>
</tr>
<tr>
<td>B.S. with Major in Geography</td>
<td></td>
</tr>
<tr>
<td>B.F.A. with major in Graphic Design and New Art Media</td>
<td></td>
</tr>
<tr>
<td>B.A. with Major in History</td>
<td>238</td>
</tr>
<tr>
<td>B.M. with Major in Instrumental Performance</td>
<td>240</td>
</tr>
<tr>
<td>B.A. with Major in International Studies</td>
<td>242</td>
</tr>
<tr>
<td>B.A. with Major in Language: Chinese Studies; Classical Studies; French</td>
<td></td>
</tr>
<tr>
<td>German Studies; Norwegian; Spanish</td>
<td></td>
</tr>
<tr>
<td>B.S. with Major in Mathematics</td>
<td>246</td>
</tr>
<tr>
<td>B.A. with Major in Music</td>
<td>248</td>
</tr>
<tr>
<td>B.M. with Major in Music Education</td>
<td>252</td>
</tr>
<tr>
<td>B.F.A. in Musical Theatre with Major in Theatre Arts</td>
<td></td>
</tr>
<tr>
<td>B.A. with Major in Philosophy and Religion</td>
<td></td>
</tr>
<tr>
<td>B.S. with Major in Physics</td>
<td></td>
</tr>
<tr>
<td>B.A. or B.S. with Major in Psychology</td>
<td></td>
</tr>
<tr>
<td>B.A. with Major in Sociology</td>
<td></td>
</tr>
<tr>
<td>B.A. in Theatre Arts with Major in Theatre Arts</td>
<td></td>
</tr>
<tr>
<td>B.A. or B.F.A. with Major in Visual Arts</td>
<td></td>
</tr>
<tr>
<td>B.M. with Major in Vocal Performance</td>
<td></td>
</tr>
</tbody>
</table>

American Indian Studies

<table>
<thead>
<tr>
<th>Plan</th>
<th>p.</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.A. with a Major in American Indian Studies A (AIS as second major)</td>
<td>220</td>
</tr>
<tr>
<td>B.A. with a Major in American Indian Studies B (four years; even year</td>
<td>221</td>
</tr>
<tr>
<td>freshman enrollment)</td>
<td></td>
</tr>
<tr>
<td>B.A. with a Major in American Indian Studies C (four years; uneven year</td>
<td>221</td>
</tr>
<tr>
<td>freshman enrollment)</td>
<td></td>
</tr>
</tbody>
</table>

B.A. with a Major in American Indian Studies A (AIS as second major)

**Freshman Year**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall: Essential Studies/First Major/Electives</td>
<td>15</td>
</tr>
<tr>
<td>Spring: Essential Studies/First Major/Electives</td>
<td>15</td>
</tr>
</tbody>
</table>

**Sophomore Year**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall: First Major/Essential Studies/Electives</td>
<td>15</td>
</tr>
<tr>
<td>Spring: First Major/Essential Studies/Electives</td>
<td>15</td>
</tr>
</tbody>
</table>

**Junior Year**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall: IS 121 or IS 122 or IS 123: Introduction to American Indian Studies or American Indians and Tradition or American Indians and Culture</td>
<td>3</td>
</tr>
<tr>
<td>IS 230: Approaches to Native Cultures</td>
<td>3</td>
</tr>
<tr>
<td>IS 360: Oral Traditions in American Indian Cultures</td>
<td>3</td>
</tr>
<tr>
<td>Elective/First Major/Essential Studies</td>
<td>6</td>
</tr>
<tr>
<td>Spring: Electives/First Major/Essential Studies</td>
<td>12</td>
</tr>
</tbody>
</table>

**Senior Year**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall: Electives/First Major/Essential Studies</td>
<td>12</td>
</tr>
<tr>
<td>IS 240: Research and Writing in Indian Studies</td>
<td>3</td>
</tr>
<tr>
<td>Spring: Electives/First Major/Essential Studies</td>
<td>9</td>
</tr>
<tr>
<td>IS 395: Ethnohistory of North America</td>
<td>3</td>
</tr>
<tr>
<td>IS 410: Indigenous Identities</td>
<td>3</td>
</tr>
<tr>
<td>Total Credits</td>
<td>120</td>
</tr>
</tbody>
</table>

This is an example of a course of study leading to a BA in American Indian Studies. Plans of courses differ between even and uneven years. Please visit with an American Indian Studies faculty member to determine a personalized plan. Students need to satisfy all published Essential Studies requirements. To
determine how to best fulfill these requirements and the electives requirements in the American Indian Studies major, students should visit with an American Indian Studies faculty member.

You must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies).

### B.A. with a Major in American Indian Studies

#### B (four years; even year freshman enrollment)

<table>
<thead>
<tr>
<th>Freshman Year</th>
<th>Fall</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IS 121</td>
<td>Introduction to American Indian Studies</td>
<td>3</td>
</tr>
<tr>
<td>or IS 122</td>
<td>or American Indians and Tradition</td>
<td></td>
</tr>
<tr>
<td>or IS 123</td>
<td>or American Indians and Culture</td>
<td></td>
</tr>
<tr>
<td>Electives/Essential Studies/Second Major</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Credits</td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

| Spring | Electives/Essential Studies/Second Major | 15 |
|        | Credits | 15 |

| Sophomore Year | Fall | Electives/Essential Studies/Second Major | 12 |
|                | IS 240 | Research and Writing in Indian Studies | 3 |
|                | American Indian Studies elective | 3 |
|                | Electives/Essential Studies/Second Major | 9 |
|                | Credits | 15 |

| Spring | Electives/Essential Studies/Second Major | 12 |
|        | IS 395 | Ethnohistory of North America | 3 |
|        | Credits | 15 |

| Junior Year | Fall | Electives/Essential Studies/Second Major | 12 |
|             | IS 230 | Approaches to Native Cultures | 3 |
|             | IS 360 | Oral Traditions in American Indian Cultures | 3 |
|             | Electives/Essential Studies/Second Major | 9 |
|             | Credits | 15 |

| Spring | IS 348 | Beyond the Reservation | 3 |
|        | Elective/Essential Studies/Second Major | 15 |

| Senior Year | Fall | Electives/Essential Studies/Second Major | 12 |
|             | IS 410 | Indigenous Identities | 3 |
|             | Electives/Essential Studies/Second Major | 12 |
|             | Credits | 15 |

| Spring | Electives/Essential Studies/Second Major | 15 |
|        | Credits | 15 |

This is an example of a course of study leading to a BA in American Indian Studies. Please visit with an American Indian Studies faculty member to determine a personalized plan. Students need to satisfy all published Essential Studies requirements. To determine how to best fulfill these requirements and the electives requirements in the American Indian Studies major, students should visit with an American Indian Studies faculty member.

You must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies).

### B.A. with a Major in American Indian Studies

#### C (four years; uneven year freshman enrollment)

<table>
<thead>
<tr>
<th>Freshman Year</th>
<th>Fall</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IS 121 or IS 122 or IS 123</td>
<td>Introduction to American Indian Studies or American Indians and Tradition or American Indians and Culture</td>
<td>3</td>
</tr>
<tr>
<td>Electives/Essential Studies/Second Major</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Credits</td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

| Spring | Electives/Essential Studies/Second Major | 15 |
|        | Credits | 15 |

| Sophomore Year | Fall | Electives/Essential Studies/Second Major | 12 |
|                | IS 240 | Research and Writing in Indian Studies | 3 |
|                | IS 230 | Approaches to Native Cultures | 3 |
|                | Electives/Essential Studies/Second Major | 9 |
|                | Credits | 15 |

| Spring | Electives/Essential Studies/Second Major | 9 |
|        | IS 395 | Ethnohistory of North America | 3 |
|        | IS 410 | Indigenous Identities | 3 |
|        | Credits | 15 |

| Junior Year | Fall | Electives/Essential Studies/Second Major | 12 |
|             | IS 348 | Beyond the Reservation | 3 |
|             | Elective/Essential Studies/Second Major | 15 |

| Senior Year | Fall | Electives/Essential Studies/Second Major | 12 |
|             | IS 360 | Oral Traditions in American Indian Cultures | 3 |
|             | Electives/Essential Studies/Second Major | 9 |
|             | Credits | 15 |

| Spring | Electives/Essential Studies/Second Major | 15 |
|        | Credits | 15 |

This is an example of a course of study leading to a BA in American Indian Studies. Please visit with an American Indian Studies faculty member to determine a personalized plan. Students need to satisfy all published Essential Studies requirements. To determine how to best fulfill these requirements and the electives requirements in the American Indian Studies major, students should visit with an American Indian Studies faculty member.

You must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)
### Anthropology

#### B.A. with a Major in Anthropology

<table>
<thead>
<tr>
<th>Freshman Year</th>
<th>Fall</th>
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</thead>
<tbody>
<tr>
<td>ANTH 170</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>or ANTH 171</td>
<td></td>
<td></td>
</tr>
<tr>
<td>or ANTH 172</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENGL 110</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

**Essential Studies Courses**

| Credits | 9 |

If students are going to meet the concentration requirement for the major by reaching Level IV proficiency in a foreign language, it is strongly recommended that they begin taking language courses in the fall semester of the freshman year.

**Sophomore Year**

<table>
<thead>
<tr>
<th>Fall</th>
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<tbody>
<tr>
<td>ANTH 171</td>
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</tr>
<tr>
<td>or ANTH 170</td>
<td></td>
</tr>
<tr>
<td>or ANTH 172</td>
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</tr>
</tbody>
</table>

**Anthropology Elective**

**Concentration Elective**

| 9 credits in the concentration must be taken at 300 level or above. |

**Essential Studies Courses**

| Credits | 6 |

**Spring**

| Credits | 15 |

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>ANTH 173</td>
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<tr>
<td>or ANTH 172</td>
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**Anthropology Elective**

**Concentration Elective**

| 3 |

**Essential Studies Courses**

| Credits | 15 |

<table>
<thead>
<tr>
<th>Fall</th>
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<tbody>
<tr>
<td>ENGL 110</td>
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<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>ANTH 480</td>
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</table>

**Anthropology/Concentration/Essential Studies/General Electives**

| Credits | 15 |

**Senior Year**

<table>
<thead>
<tr>
<th>Fall</th>
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<tbody>
<tr>
<td>ANTH 480</td>
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**Anthropology/Concentration/Essential Studies/General Electives**

| Credits | 15 |

<table>
<thead>
<tr>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ANTH 480</td>
<td>3</td>
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</tbody>
</table>

**Anthropology/Concentration/Essential Studies/General Electives**

| Credits | 12 |

This plan of study represents just one way in which a student can complete the requirements for the Bachelor of Arts in Anthropology within four years. Because of the large number of ways to complete the degree requirements for this major, students should always consult their adviser for assistance regarding their specific plan of study.

You must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements (https://und.edu/academics/ essential-studies).

### Biology

#### B.S. with Major in Biology, Fisheries and Wildlife

##### B.S. with Major in Biology - General Option

##### B.S. with Major in Biology, Molecular and Integrative - Basic Life Science Option

##### B.S. with Major in Biology, Molecular and Integrative - Enhanced Applied Life Science Option

##### B.S. with Major in Biology - Pre-Health Sciences Emphasis

#### B.S. with Major in Biology, Fisheries and Wildlife

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<tr>
<th>Freshman Year</th>
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<tbody>
<tr>
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<tr>
<td>BIOL 150</td>
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</tr>
<tr>
<td>&amp; 150L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEM 121</td>
<td>4</td>
<td></td>
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<tr>
<td>&amp; 121L</td>
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<td>ENGL 110</td>
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**Essential Studies Elective**

| Credits | 3-4 |

**Spring**

| Credits | 15-16 |

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<tr>
<td>&amp; 151L</td>
<td></td>
</tr>
<tr>
<td>CHEM 122</td>
<td>4</td>
</tr>
<tr>
<td>&amp; 122L</td>
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<tr>
<td>MATH 146</td>
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<tr>
<td>or MATH 165</td>
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**Spring**

| Credits | 3 |

<table>
<thead>
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<tbody>
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<table>
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<tbody>
<tr>
<td>BIOL 151</td>
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<tr>
<td>&amp; 151L</td>
<td></td>
</tr>
<tr>
<td>CHEM 122</td>
<td>4</td>
</tr>
<tr>
<td>&amp; 122L</td>
<td></td>
</tr>
<tr>
<td>MATH 146</td>
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<tr>
<td>or MATH 165</td>
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| Credits | 3 |

<table>
<thead>
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<tbody>
<tr>
<td>BIOL 151</td>
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<tr>
<td>&amp; 151L</td>
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</tr>
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<td>CHEM 122</td>
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<tr>
<td>&amp; 122L</td>
<td></td>
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<tr>
<td>MATH 146</td>
<td>3-4</td>
</tr>
<tr>
<td>or MATH 165</td>
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| Credits | 3 |

<table>
<thead>
<tr>
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<tbody>
<tr>
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<tbody>
<tr>
<td>BIOL 151</td>
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<td>CHEM 122</td>
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<td>&amp; 122L</td>
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<td>MATH 146</td>
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<td>or MATH 165</td>
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| Credits | 3 |
### Essential Studies Elective

<table>
<thead>
<tr>
<th>credits</th>
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<tr>
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### Sophomore Year

#### Fall

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>BIOL 315 &amp; 315R</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 332 &amp; 332L</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 396</td>
<td>1</td>
</tr>
<tr>
<td>GEOL 101</td>
<td>4</td>
</tr>
<tr>
<td>COMM 110</td>
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#### Spring

<table>
<thead>
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<th>Course</th>
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<tbody>
<tr>
<td>BIOL 312 &amp; 312R</td>
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<tr>
<td>BIOL 333</td>
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<td>BIOL Elective</td>
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<td>Essential Electives</td>
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### Junior Year

#### Fall

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>BIOL 336 or BIOL 439</td>
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</tr>
<tr>
<td>BIOL 397</td>
<td>1</td>
</tr>
<tr>
<td>BIOL 431 or BIOL 432</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 470</td>
<td>4</td>
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<td>Essential Electives</td>
<td>3-4</td>
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<td>Total Credits</td>
<td>15-17</td>
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#### Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BIOL 438 or BIOL 430</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 350</td>
<td>3</td>
</tr>
<tr>
<td>BIOL Electives</td>
<td>3-4</td>
</tr>
<tr>
<td>General Elective</td>
<td>3-4</td>
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<td>Essential Electives</td>
<td>3-4</td>
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### Senior Year

#### Fall

<table>
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<tbody>
<tr>
<td>BIOL 336 or BIOL 439</td>
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<tr>
<td>BIOL 431 or BIOL 432</td>
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<td>BIOL Electives</td>
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<tr>
<td>General Elective</td>
<td>1-4</td>
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<td>Essential Electives</td>
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#### Spring

<table>
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<th>Course</th>
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<tbody>
<tr>
<td>BIOL 438 or BIOL 430</td>
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<tr>
<td>GEOL 474 &amp; 474L</td>
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<tr>
<td>BIOL 481</td>
<td>3</td>
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<tr>
<td>GEOG 474</td>
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<td>Total Credits</td>
<td>15-16</td>
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</table>

The B.S. with Major in Fisheries and Wildlife Biology is designed to prepare students for careers in state, private and federal fisheries and wildlife or conservation organizations. A summer internship or cooperative education experience is required between the sophomore and junior or senior year. This is one possible way to complete the degree in 4 years but there is flexibility to allow students to customize the program of study to their own needs. Students are highly encouraged to meet with their advisor to personalize their program of study. 1 = Recitations are optional but if desired should be taken at the same time as the lecture course. 2 = A minimum of 12 credits of Biology Electives are required with all 12 credits either from the following list (Biol 338, Biol 360, Biol 363, Biol 364/364L, Biol 376/376L, Biol 380, Biol 425, Biol 426, Biol 433, Biol 435) or any of Biol 336, Biol 350, Biol 430, Biol 431, Biol 432, and Biol 438 NOT used to meet the advanced plant or management courses requirements. 3= Either Biol 336 or Biol 350 will meet advanced plant course requirement.

You must complete enough electives to bring total credit hours up to the 125. Special emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)

### B.S. with Major in Biology - General Option

#### Freshman Year

##### Fall

<table>
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<tr>
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<td>BIOL 150</td>
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<td>CHEM 121 &amp; 121L</td>
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</tr>
<tr>
<td>ENGL 110</td>
<td>3</td>
</tr>
<tr>
<td>MATH 146 or MATH 165</td>
<td>3-4</td>
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<tr>
<td>Total Credits</td>
<td>15-16</td>
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##### Spring

<table>
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<th>Course</th>
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<tbody>
<tr>
<td>BIOL 151 &amp; 151L</td>
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<tr>
<td>CHEM 122 &amp; 122L</td>
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<tr>
<td>ENGL 130</td>
<td>3</td>
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<td>COMM 110</td>
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<td>General Elective</td>
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#### Sophomore Year

##### Fall

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<tbody>
<tr>
<td>BIOL 315 &amp; 315R</td>
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</tr>
<tr>
<td>BIOL 332 &amp; 332L</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 341</td>
<td>3</td>
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<tr>
<td>CHEM 341L</td>
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<td>Essential Electives</td>
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##### Spring

<table>
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<td>BIOL 312 &amp; 312R</td>
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<td>BIOL 341 &amp; 341L</td>
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B.S. with Major in Biology, Molecular and Integrative - Basic Life Science Option

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<th>Course Title</th>
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<tbody>
<tr>
<td>Fall</td>
<td>CHEM 341L &amp; 342L</td>
<td>Organic Chemistry I &amp; II Laboratory</td>
<td>3-4</td>
<td>or Survey of Organic Chemistry Laboratory</td>
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<tr>
<td>Fall</td>
<td>BIO 311 or BIO 312</td>
<td>Essential Studies Elective</td>
<td>3-4</td>
<td>or Survey of Organic Chemistry Laboratory</td>
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<tr>
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<td>BIOL 150 or BIOL 151</td>
<td>General Biology I &amp; 150L</td>
<td>4</td>
<td>and General Biology I Laboratory</td>
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<td>CHEM 121 or CHEM 122</td>
<td>General Chemistry I &amp; 121L</td>
<td>4</td>
<td>and General Chemistry I Laboratory</td>
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<td>Fall</td>
<td>ENGL 110</td>
<td>College Composition I</td>
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<td>MATH 146 or MATH 165</td>
<td>Applied Calculus I</td>
<td>3-4</td>
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<td>CHEM 122 or CHEM 123</td>
<td>General Chemistry II &amp; 122L</td>
<td>4</td>
<td>and General Chemistry II Laboratory</td>
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<tr>
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<td>COMM 110</td>
<td>Fundamentals of Public Speaking</td>
<td>3</td>
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<td>4</td>
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<td>CHEM 341 or CHEM 341L</td>
<td>Organic Chemistry I Laboratory</td>
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<td>Evolution</td>
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<td>Evolution Recitation</td>
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<td>BIOL 343 or CHEM 343</td>
<td>Organic Chemistry II</td>
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<td>Spring</td>
<td>CHEM 344 or CHEM 344L</td>
<td>Organic Chemistry II Laboratory</td>
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<td>and Developmental Biology Lab</td>
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<tr>
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<td>College Physics I</td>
<td>4</td>
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<td>3-4</td>
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<td>BIOL 415</td>
<td>Genomics</td>
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<td>BIOL 416 or BIO 418</td>
<td>Ecological Genomics (offered in even years only)</td>
<td>3-4</td>
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<td>BMB 301</td>
<td>Biochemistry</td>
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<td>PHYS 212</td>
<td>College Physics II</td>
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This is one possible way to complete the degree in 4 years. The B.S. with Major in Biology is designed to be flexible to allow students to customize the program of study to their own needs including allowing for semesters with internships or study abroad. Students are highly encouraged to meet with their advisor to personalize their program of study. 1 = Recitations are optional but if desired should be taken at the same time as the lecture course. 2 = Students are required to take 4 upper level labs. Biol 332L and 341L would go toward the upper level lab requirement but students do not have to take Biol 332L or 341L. 3 = Organic chemistry requirement can be met either by taking Chem 341/L & 342/L, or Chem 341/L & BMB 301, or Chem 340/L & BMB 301. Note that Chem 340/L and BMB 301 are offered in the same semester so it takes 2 years to complete that option. Students considering medical school are encouraged to take Chem 341/341L, Chem 342/342L, and BMB 301 because some medical schools require or prefer this combination. 4 = Biology electives are any 300 and 400 level biology courses not used to meet other program requirements (i.e., not a core course or capstone course). Students can use up to 2 life sciences courses offered outside the Biology Department toward the Biology Electives (e.g., Anat 204, MBio 302, MBio 328, PPT 301). There are some restrictions so students should check the catalog carefully or talk with their advisor if thinking about using outside courses.

You must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)
### Senior Year

<table>
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<tbody>
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<td>BIOL 442 &amp; 442L</td>
<td>Physiology of Organs and Systems and Physiology of Organs and Systems Laboratory 2</td>
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### Junior Year

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<td>Cell Biology and Cell Biol Lab 2</td>
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<td>Organic Chemistry II 3</td>
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<tr>
<td>BIOL 415</td>
<td>Genomics 2</td>
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<tr>
<td>BIOL 416 or BIOL 418</td>
<td>Ecological Genomics (offered in even years only)</td>
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<tr>
<td><strong>BMB 301</strong></td>
<td><strong>Biochemistry 3</strong></td>
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<td><strong>College Physics II</strong></td>
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### Sophomore Year

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<tr>
<td>BIOL 315 &amp; 315R</td>
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<td>BIOL 332</td>
<td>General Ecology</td>
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<td>CHEM 341</td>
<td>Organic Chemistry I (or General Elective) 3</td>
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<td>CHEM 341L</td>
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<tr>
<td>BIOL 312 &amp; 312R</td>
<td>Evolution and Evolution Recitation 1</td>
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<td>BIOL 470 or SOCI 326</td>
<td>Biometry or Sociological Statistics</td>
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<tr>
<td>CHEM 333</td>
<td>Analytical Chemistry</td>
</tr>
<tr>
<td>PHYS 211</td>
<td>College Physics I</td>
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<td><strong>Essential Studies Elective</strong></td>
<td><strong>3-4</strong></td>
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### B.S. with Major in Biology, Molecular and Integrative-Enhanced Applied Life Science Option

#### Freshman Year

<table>
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<tr>
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<tbody>
<tr>
<td>BIOL 120</td>
<td>Orientation to the Biology Major</td>
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<tr>
<td>BIOL 150 &amp; 150L</td>
<td>General Biology I and General Biology I Laboratory</td>
</tr>
<tr>
<td>CHEM 121 &amp; 121L</td>
<td>General Chemistry I and General Chemistry I Laboratory</td>
</tr>
<tr>
<td>ENGL 110</td>
<td>College Composition I</td>
</tr>
<tr>
<td>MATH 146 or MATH 165</td>
<td>Applied Calculus I or Calculus I</td>
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<td><strong>Credits</strong></td>
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<table>
<thead>
<tr>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BIOL 151 &amp; 151L</td>
<td>General Biology II and General Biology II Laboratory</td>
</tr>
<tr>
<td>CHEM 122 &amp; 122L</td>
<td>General Chemistry II and General Chemistry II Laboratory</td>
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<tr>
<td>ENGL 130</td>
<td>Composition II: Writing for Public Audiences</td>
</tr>
<tr>
<td>COMM 110</td>
<td>Fundamentals of Public Speaking</td>
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<tr>
<td><strong>Essential Studies Elective</strong></td>
<td><strong>3-4</strong></td>
</tr>
<tr>
<td><strong>Credits</strong></td>
<td><strong>17-18</strong></td>
</tr>
</tbody>
</table>

The B.S. with Major in Molecular and Integrative Biology with the Basic Life Science option is designed for students interested in integrating knowledge across levels of biological organization and provides a strong foundation for students planning to continue their studies in medical science, graduate, or professional programs. This is one possible way to complete the degree in 4 years but there is flexibility to allow students to customize the program of study to their own needs including allowing for semesters with internships or study abroad. Students are highly encouraged to meet with their advisor to personalize their program of study. 1 = Recitations are optional but if desired should be taken at the same time as the lecture course, 2 = Students are required to take 4 upper level labs. These courses meet the upper level lab requirement. 3 = Organic chemistry requirement can be met either by taking Chem 341/L & 342/L, or Chem 341/L & BMB 301, or Chem 340/L. Students considering medical school are encouraged to take Chem 341/341L, Chem 342/342L, and BMB 301 because some medical schools require or prefer this combination.

You must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)
knowledge across levels of biological organization and who are interested in pursuing technical positions or further training in applied health science and biotechnology. This is one possible way to complete the degree in 4 years but there is flexibility to allow students to customize the program of study to their own needs including allowing for semesters with internships or study abroad. Students are highly encouraged to meet with their advisor to personalize their program of study. 1 = Recitations are optional but if desired should be taken at the same time as the lecture course. 2 = Students are required to take 4 upper level labs. These courses meet the upper level lab requirement. 3 = Organic chemistry requirement can be met either by taking Chem 341/L & 342/L, Chem 341/L & BMB 301, or Chem 340/L. Students considering medical school are encouraged to take Chem 341/341L, Chem 342/342L, and BMB 301 because some medical schools require or prefer this combination. 4 = Students in this major interested in a career in the biotechnology industry are encouraged to consider taking entrepreneurship courses. Students are also strongly encouraged to gain research experience which could be done for credit through BIOL 492.

You must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)

### B.S. with Major in Biology - Pre-Health Sciences Emphasis

#### Freshman Year

<table>
<thead>
<tr>
<th>Fall</th>
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<tbody>
<tr>
<td>BIOL 120</td>
<td>Orientation to the Biology Major</td>
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<tr>
<td>BIOL 150 &amp; 150L</td>
<td>General Biology I and General Biology I Laboratory</td>
</tr>
<tr>
<td>CHEM 121 &amp; 121L</td>
<td>General Chemistry I and General Chemistry I Laboratory</td>
</tr>
<tr>
<td>ENGL 110</td>
<td>College Composition I</td>
</tr>
<tr>
<td>MATH 146 or MATH 165</td>
<td>Applied Calculus I or Calculus I</td>
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**Total Credits**: 15-16

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<tbody>
<tr>
<td>BIOL 151</td>
<td>General Biology II and General Biology II Laboratory</td>
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<tr>
<td>CHEM 122 &amp; 122L</td>
<td>General Chemistry II and General Chemistry II Laboratory</td>
</tr>
<tr>
<td>ENGL 130</td>
<td>Composition II: Writing for Public Audiences</td>
</tr>
<tr>
<td>COMM 110</td>
<td>Fundamentals of Public Speaking</td>
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<td>General Electives</td>
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**Total Credits**: 15-17

#### Sophomore Year

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<td>BIOL 315 &amp; 315R</td>
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<td>Organic Chemistry I (Or General Elective)</td>
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<tr>
<td>CHEM 341L</td>
<td>Organic Chemistry I Laboratory (Or General Elective)</td>
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<td>General Electives</td>
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**Total Credits**: 17-20

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<td>BIOL 341 &amp; 341L</td>
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<td>Organic Chemistry II or Survey of Organic Chemistry</td>
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<td>CHEM 342L or CHEM 340L</td>
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**Essential Studies Elective**: 3-4

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<td>BIOL 470 or SOC 326 or PSYC 241</td>
<td>Biometry or Sociological Statistics or Introduction to Statistics</td>
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<td>PHYS 211 or PHYS 161 or PHYS 251</td>
<td>College Physics I or Introductory College Physics I or University Physics I</td>
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<tr>
<td>Biology Elective</td>
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<tr>
<td>General Elective</td>
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**Total Credits**: 14-17

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<td>PHYS 212 or PHYS 162 or PHYS 252</td>
<td>College Physics II or Introductory College Physics II or University Physics II</td>
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<td>BMB 301</td>
<td>Biochemistry (Or General Elective)</td>
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**Total Credits**: 16-20

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<td>Senior Capstone Seminar (Or Biology Elective)</td>
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**Total Credits**: 15-19

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**Total Credits**: 14-17

**Total Credits**: 122-145

The B.S. with Major in Biology with Pre-Health Science Emphasis is designed for students interested in medicine or allied medical fields. This is one possible way to complete the degree in 4 years but there is flexibility to allow students to customize the program of study to their own needs including allowing for semesters with internships or study abroad. Students are highly encouraged to meet with their advisor to personalize their program of study. 1 = Recitations are optional but if desired should be taken at the same time as the lecture course. 2 = Students are required to take 4 upper level labs. Biol 341/L could go toward the upper level lab requirement but students do not have to take Biol 341/L. 3 = Organic chemistry requirement can be met either by taking Chem 341/L & 342/L, Chem 341/L & BMB 301, or Chem 340/L & BMB 301. Note that Chem 340/L and BMB 301 are offered in the same semester so it takes 2 years to complete that option. Students considering medical school are encouraged to take Chem 341/341L, Chem 342/342L, and BMB 301 because some medical schools require or prefer this combination. 4 = A minimum of 21 credits of Biology Electives are required with at least 9 credits from the following list (Anat 204/204L, Biol 364/364L, Biol 369/369L, Biol 378, Biol 380, Biol 390, Biol 415, Biol 418, Biol 420, Biol 442/442L, MBio 302/302L, MBio 328). Students can use up to 3 life sciences courses offered outside the Biology Department toward the Biology Electives (e.g., Anat 204, BMB 401, BMB 403, MBio 302, MBio 328, PPT 301). There are some restrictions on the classes a student can use to complete the catalog requirements carefully or talk with their advisor if thinking about using outside courses.

You must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)
Chemistry

B.S. in Chemistry - ACS Degree (p. 227)
B.S. with Major in Chemistry - Biochemistry Option
B.S. with Major in Chemistry - Physical Science Option

B.S. in Chemistry - ACS Degree

Freshman Year

Fall

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<td>CHEM 221</td>
<td>Fundamentals of Chemistry - Concepts</td>
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<td>Fundamentals of Chemistry Laboratory</td>
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Total Credits: 15

Spring

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Total Credits: 14

Sophomore Year

Fall

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<td>CHEM 341</td>
<td>Organic Chemistry I</td>
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<td>Organic Chemistry I Laboratory</td>
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<td>CHEM 361</td>
<td>Problem Solving in Organic Chemistry I</td>
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Total Credits: 17

Spring

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<td>CHEM 342L</td>
<td>Organic Chemistry II Laboratory</td>
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<tr>
<td>CHEM 362</td>
<td>Problem Solving in Organic Chemistry II</td>
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<td>PHYS 252</td>
<td>University Physics II</td>
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Total Credits: 15

Junior Year

Fall

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<td>Inorganic Chemistry II</td>
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<td>CHEM 454L</td>
<td>Inorganic Chemistry II Laboratory</td>
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<tr>
<td>CHEM 466</td>
<td>Fundamentals of Physical and Biophysical Chemistry</td>
<td>4</td>
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<tr>
<td>CHEM 443</td>
<td>Instrumental Analysis III - Chromatography/Mass Spectrometry</td>
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Total Credits: 16

Spring

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<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 471</td>
<td>Quantum Mechanics &amp; Spectroscopy</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 471R</td>
<td>Quantum Mechanics &amp; Spectroscopy Recitation</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 462</td>
<td>Physical Chemistry Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 441</td>
<td>Instrumental Analysis I - Spectroscopy</td>
<td>2</td>
</tr>
<tr>
<td>BMB 301</td>
<td>Biochemistry</td>
<td>3</td>
</tr>
<tr>
<td>Second Semester of a Foreign Language</td>
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</tbody>
</table>

Total Credits: 16

Senior Year

Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 492</td>
<td>Senior Research</td>
<td>6</td>
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<tr>
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Total Credits: 15

Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 442</td>
<td>Instrumental Analysis II - Electrochemistry</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 495</td>
<td>Chemistry Capstone</td>
<td>6</td>
</tr>
<tr>
<td>Electives</td>
<td></td>
<td>10</td>
</tr>
</tbody>
</table>

Total Credits: 15

REQUIRED 125 credits (36 of which must be numbered 300 or above and 60 of which must be from a 4-year institution) including: I. Essential Studies Requirements (see University ES guidelines and course listings). II. The Following Curriculum: Major Requirements - 51 hours of Chemistry including the courses listed above. FOOTNOTES: 1 = If a student is not ready for Math 165, the math sequence may be moved back one semester and Math 107 (also Math 103, if needed) should be taken in the first semester. 2 = Suggested electives are courses in Physics, Mathematics, Biochemistry, Biology, Languages, Computer Science, Chemical Engineering, Business Management, and Speech. 3 = Chem 44x (441, 442 and 443) courses are offered within a regular, two-year cycle. Students can take Chem 44x courses in any order and that order may differ from one shown above. To complete the degree in 4 years, students must start their Junior Year by taking the first available Chem 44x course of the cycle. 4 = Graduate level courses in chemistry may be taken as electives. You must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)

5 = Two semesters of a foreign language are required. If a student wishes to pursue Study Abroad, taking language courses earlier is recommended. 6 = If the student has another major, a non-chemistry capstone course may be taken. If so, the student must take 1 credit of either Chem 392, Special Problems in Chemistry, or Chem 492, Senior Research.

B.S. with Major in Chemistry - Biochemistry Option

Freshman Year

Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 101</td>
<td>Orientation to Chemistry</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 121</td>
<td>General Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 121L</td>
<td>General Chemistry I Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>ENGL 110</td>
<td>College Composition I</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 150</td>
<td>General Biology I</td>
<td>1</td>
</tr>
<tr>
<td>BIOL 150L</td>
<td>General Biology I Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>Essential Studies Electives</td>
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</table>

Total Credits: 15

Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CHEM 122</td>
<td>General Chemistry II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 122L</td>
<td>General Chemistry II Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>ENGL 130</td>
<td>Composition II: Writing for Public Audiences</td>
<td>3</td>
</tr>
<tr>
<td>MATH 146</td>
<td>Applied Calculus I</td>
<td>2</td>
</tr>
<tr>
<td>BIOL 151</td>
<td>General Biology II</td>
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<tr>
<td>BIOL 151L</td>
<td>General Biology II Laboratory</td>
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<tr>
<td>Essential Studies Electives</td>
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</table>

Total Credits: 14

Sophomore Year

Fall

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<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CHEM 333</td>
<td>Analytical Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 333L</td>
<td>Analytical Chemistry Laboratory</td>
<td>1</td>
</tr>
</tbody>
</table>

Total Credits: 1
CHEM 341  Organic Chemistry I  3
CHEM 341L  Organic Chemistry I Laboratory  1
CHEM 361  Problem Solving in Organic Chemistry I  1
PHYS 211  College Physics I  4
Essential Studies Electives  3

Spring
CHEM 342  Organic Chemistry II  3
CHEM 342L  Organic Chemistry II Laboratory  1
CHEM 362  Problem Solving in Organic Chemistry II  1
PHYS 212  College Physics II  4

TOTAL CREDITS  16

Junior Year
Fall
CHEM 466  Fundamentals of Physical and Biophysical Chemistry  4
First Semester of a Foreign Language  4
Electives  8

Spring
CHEM 467  Survey of Physical Chemistry Laboratory  2
BMB 301  Biochemistry  3
Second Semester of a Foreign Language  4
Electives  6

TOTAL CREDITS  16

Senior Year
Fall
BMB 401  Biochemistry of Proteins and Information Flow  3
BMB 403  Advanced Biochemistry Laboratory  2
Electives  9

Spring
CHEM 495  Chemistry Capstone  3
Electives  12

TOTAL CREDITS  15

TOTAL CREDITS  120

REQUIRED 125 credits (36 of which must be numbered 300 or above and 60 of which must be from a 4-year institution) including: I. General Education Requirements (see University GER listing). II. The Following Curriculum: Major Requirements - 37 hours of Chemistry including the courses listed above. FOOTNOTES: 1 = Biology 150 and 151 can be taken in the sophomore year. They are prerequisites to other required biology courses. 2 = If a student is not ready for Math 146, Math 103 should be taken in the first semester. If a student would like the option to change into the B.S. in Chemistry or the B.S. with Major in Chemistry with emphasis for the Physical Science Option at a later date, be aware that Math 165, 166, and 265 are required. If a student who begins either the B.S. in Chemistry or the B.S. with Major in Chemistry with emphasis for the Physical Science Option wishes to change to the Biochemistry Option, Math 165 will substitute for Math 146. 3 = Electives must include 3 credit hours from Cell Biology (Biol 341), Genetics (Biol 315), or Microbiology (MBio 302L) and 1 credit hour from either Special Problems in Chemistry (Chem 392) or Senior Research (Chem 492). Other suggested electives are courses in Physics, Mathematics, Biochemistry, Biology, Languages, Computer Science, Chemical Engineering, Business Management, and Speech.

You must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)

4 = Two semesters of a foreign language are required. If a student wishes to pursue Study Abroad, taking language courses earlier is recommended.

B.S. with Major in Chemistry - Physical Science Option

Freshman Year
Fall
CHEM 101  Orientation to Chemistry  1
CHEM 121  General Chemistry I  3
CHEM 121L  General Chemistry Laboratory  1
ENGL 110  College Composition I  3
MATH 165  Calculus I  4
Essential Studies Electives  3

Spring
CHEM 122  General Chemistry II  3
CHEM 122L  General Chemistry Laboratory  1
ENGL 130  Composition II: Writing for Public Audiences  3
MATH 166  Calculus II  4
Essential Studies Electives  3

Sophomore Year
Fall
CHEM 333  Analytical Chemistry  3
CHEM 333L  Analytical Chemistry Laboratory  1
CHEM 341  Organic Chemistry I  3
CHEM 341L  Organic Chemistry Laboratory  1
CHEM 361  Problem Solving in Organic Chemistry I  1
PHYS 251  University Physics I  4
MATH 265  Calculus III  4

Spring
CHEM 342  Organic Chemistry II  3
CHEM 342L  Organic Chemistry II Laboratory  1
CHEM 362  Problem Solving in Organic Chemistry II  1
PHYS 252  University Physics II  4
Essential Studies & Other Electives  6

Junior Year
Fall
CHEM 443  Instrumental Analysis III - Chromatography/Mass Spectrometry  2
CHEM 466  Fundamentals of Physical and Biophysical Chemistry  4
First Semester of a Foreign Language  4
Electives  5

Spring
CHEM 471  Quantum Mechanics & Spectroscopy  3
CHEM 471R  Quantum Mechanics & Spectroscopy Recitation  1
CHEM 462  Physical Chemistry Laboratory  3
CHEM 441  Instrumental Analysis I - Spectroscopy  2
Second Semester of a Foreign Language  4
Electives  2

Senior Year
Fall
Electives  15

Spring
CHEM 442  Instrumental Analysis II - Electrochemistry  2
CHEM 495  Chemistry Capstone  3
Electives  
<table>
<thead>
<tr>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
</tr>
</tbody>
</table>

Total Credits 14

REQUIRED 125 credits (36 of which must be numbered 300 or above and 60 of which must be from a 4-year institution) including: I. Essential Studies Requirements (see University ES guidelines and course listings). II. The Following Curriculum: Major Requirements - 51 hours of Chemistry including the courses listed above. FOOTNOTES: 1 = If a student is not ready for Math 165, the math sequence may be moved back one semester and Math 107 (also Math 103, if needed) should be taken in the first semester. 2 = Suggested electives are courses in Physics, Mathematics, Biochemistry, Biology, Languages, Computer Science, Chemical Engineering, Business Management, and Speech. 3 = Chem 44x (441, 442 and 443) courses are offered within a regular, two-year cycle. Students can take Chem 44x courses in any order and that order may differ from one shown above. To complete the degree in 4 years, students must start their Junior Year by taking the first available Chem 44x course of the cycle. 4 = One credit hour must be from either Special Problems in Chemistry (Chem 392) or Senior Research (Chem 492). Graduate level courses in chemistry may be taken as electives.

You must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)

5 = Two semesters of a foreign language are required. If a student wishes to pursue Study Abroad, taking language courses earlier is recommended.

### Communication Sciences and Disorders

#### B.A. with Major in Communication Sciences and Disorders

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>MATH 103</td>
<td>College Algebra</td>
</tr>
<tr>
<td>BIOL 111</td>
<td>Concepts of Biology</td>
</tr>
<tr>
<td>BIOL 111L</td>
<td>Concepts of Biology Laboratory</td>
</tr>
<tr>
<td>ENGL 110</td>
<td>College Composition I</td>
</tr>
<tr>
<td>COMM 110</td>
<td>Fundamentals of Public Speaking</td>
</tr>
<tr>
<td>PSYC 111</td>
<td>Introduction to Psychology</td>
</tr>
</tbody>
</table>

Total Credits 16

<table>
<thead>
<tr>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 130</td>
<td>Composition II: Writing for Public Audiences</td>
</tr>
<tr>
<td>CHEM 115</td>
<td>Introductory Chemistry</td>
</tr>
<tr>
<td>or PHYS 130</td>
<td>or Natural Science-Physics</td>
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</tbody>
</table>

Essential Studies: Fine Arts/Humanities 6

Total Credits 15

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CSD 223</td>
<td>Phonetics</td>
</tr>
<tr>
<td>CSD 231</td>
<td>Anatomy and Physiology of the Speech and Hearing Mechanism</td>
</tr>
<tr>
<td>CSD 232</td>
<td>Survey of Communication Disorders</td>
</tr>
<tr>
<td>PSYC 241</td>
<td>Introduction to Statistics</td>
</tr>
<tr>
<td>An elective</td>
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</table>

Total Credits 17

<table>
<thead>
<tr>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CSD 235</td>
<td>Speech and Hearing Science</td>
</tr>
<tr>
<td>CSD 340</td>
<td>Normal Language Structure</td>
</tr>
<tr>
<td>PSYC 250</td>
<td>Developmental Psychology</td>
</tr>
<tr>
<td>A 300 level or above course in Teaching &amp; Learning</td>
<td>3</td>
</tr>
</tbody>
</table>
Essential Studies: Fine Arts/Humanities 3

Junior Year
Fall
- CSD 343 Language Development 3
- CSD 343L Language Development Laboratory 2
- CSD 431 Introduction to Audiology 3
- PSYC 270 Abnormal Psychology 3
- PSYC 355 or SWK 313 Adulthood and Aging or Orientation to Gerontology 3

An elective 3

Credits 17

Spring
CSD 333 Speech Sound Development and Disorders 3
CSD 434 Aural Rehabilitation 3
ENGL 308 The Art of Writing Nonfiction 3
SWK 313 When PSYC 355 or SOC 352 not already taken 3
An elective 3

Credits 17-18

Senior Year
Fall
- CSD 400 School Programs in Speech-Language-Hearing 3
- CSD 425 Language, Multiculturalism and Communication Disorders 3
- CSD 440 Language Disorders I 3
- CSD 484 Clinical Practicum I: Speech-Language Pathology 3
- T&L 486 Field Experience 1-4

An elective 3

Credits 15

Spring
CSD 422 Neuroanatomy of Communication Disorders 3
CSD 438 Craniofacial Anomalies 2
CSD 441 Language Disorders II 3
CSD 485 Clinical Practicum II: Speech Language Pathology 3
An elective 3

Credits 16

Total Credits 127-131

You must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)

## Computer Science

### B.A. with Major in Computer Science

<table>
<thead>
<tr>
<th>Freshman Year</th>
<th>Fall</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSCI 160</td>
<td>Computer Science I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 103</td>
<td>College Algebra</td>
<td>3</td>
</tr>
<tr>
<td>or MATH 107</td>
<td>or Precalculus</td>
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</tr>
<tr>
<td>ENGL 110</td>
<td>College Composition I</td>
<td>3</td>
</tr>
<tr>
<td>Foreign Language I</td>
<td></td>
<td>4</td>
</tr>
</tbody>
</table>

| Spring | CSCI 161 | Computer Science II | 4 |
|        | ENGL 130 | Composition II: Writing for Public Audiences | 3 |
|        | MATH 208 | Discrete Mathematics | 3 |
|        | Foreign Language II | | 4 |

| E.S. Social Science Elective | 3 |

<table>
<thead>
<tr>
<th>Sophomore Year</th>
<th>Fall</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CSCI 242</td>
<td>Algorithms and Data Structures</td>
<td>3</td>
</tr>
<tr>
<td>EE 201</td>
<td>Introduction to Digital Electronics</td>
<td>2</td>
</tr>
<tr>
<td>EE 202</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>E.S. Fine Arts Elective</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>COMM 110</td>
<td>Fundamentals of Public Speaking</td>
<td>3</td>
</tr>
<tr>
<td>Foreign Language III (recommended)</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

| Spring | CSCI 365 | Organization of Programming Languages | 3 |
|        | CSCI 370 | Computer Architecture | 4 |
|        | CSCI Elective | | 3 |
|        | E.S. Social Science Elective | | 3 |
|        | UND Elective | | 3 |

<table>
<thead>
<tr>
<th>Senior Year</th>
<th>Fall</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSCI 451</td>
<td>Operating Systems I</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 465</td>
<td>Principles of Translation</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 492</td>
<td>Senior Project I</td>
<td>2</td>
</tr>
<tr>
<td>CSCI Elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>UND Electives</td>
<td></td>
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</tr>
</tbody>
</table>

| Spring | CSCI 493 | Senior Project II | 2 |
|        | UND Electives | | 12 |

| Credits | 14 |

| Total Credits | 125 |

You must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)

## Criminal Justice Studies

### B.S. in Criminal Justice Studies

<table>
<thead>
<tr>
<th>Freshman Year</th>
<th>Fall</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CJ 201</td>
<td>Introduction to Criminal Justice</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 110</td>
<td>College Composition I</td>
<td>3</td>
</tr>
</tbody>
</table>

| Spring | CSCI 365 | Organization of Programming Languages | 3 |
|        | CSCI 370 | Computer Architecture | 4 |
|        | CSCI Elective | | 3 |
|        | E.S. Social Science Elective | | 3 |
|        | UND Elective | | 3 |

<table>
<thead>
<tr>
<th>Senior Year</th>
<th>Fall</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSCI 451</td>
<td>Operating Systems I</td>
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<td>CSCI 465</td>
<td>Principles of Translation</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 492</td>
<td>Senior Project I</td>
<td>2</td>
</tr>
<tr>
<td>CSCI Elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>UND Electives</td>
<td></td>
<td>5</td>
</tr>
</tbody>
</table>

| Spring | CSCI 493 | Senior Project II | 2 |
|        | UND Electives | | 12 |

| Credits | 14 |

| Total Credits | 125 |
This plan of study represents just one way in which a student can complete the requirements for the Bachelor of Science in Criminal Justice Studies within four years. Because of the large number of ways to complete the degree requirements for this major, students should always consult their adviser for assistance regarding their specific plan of study.

You must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)

## Economics

### B.A. with Major in Economics

#### Freshman Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CJ 220</td>
<td>Introduction to Courts</td>
</tr>
<tr>
<td>Course in Concentration Area</td>
<td>3</td>
</tr>
<tr>
<td>Essential Studies Elective: MST</td>
<td>3-4</td>
</tr>
<tr>
<td>General Electives</td>
<td>3</td>
</tr>
<tr>
<td>COMM 110</td>
<td>Fundamentals of Public Speaking</td>
</tr>
<tr>
<td><strong>Credits</strong></td>
<td><strong>15-16</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 130</td>
<td>Composition II: Writing for Public Audiences</td>
</tr>
<tr>
<td>CJ 330</td>
<td>Criminological Theory</td>
</tr>
<tr>
<td>SOC 326</td>
<td>Sociological Statistics</td>
</tr>
<tr>
<td>General Electives</td>
<td>4</td>
</tr>
<tr>
<td>General Electives</td>
<td>3</td>
</tr>
<tr>
<td><strong>Credits</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

#### Sophomore Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 210</td>
<td>Introduction to Business and Economic Statistics</td>
</tr>
<tr>
<td>ECON 308</td>
<td>Intermediate Macroeconomic Theory and Policy</td>
</tr>
<tr>
<td>Essential Studies: Social Science (Non-economics)</td>
<td>3</td>
</tr>
<tr>
<td>Open Electives</td>
<td>7</td>
</tr>
<tr>
<td><strong>Credits</strong></td>
<td><strong>16</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 303</td>
<td>Money and Banking</td>
</tr>
<tr>
<td>ECON 309</td>
<td>Intermediate Macroeconomic Theory and Policy</td>
</tr>
<tr>
<td>Essential Studies: Lab Science</td>
<td>4</td>
</tr>
<tr>
<td>Essential Studies/Special Emphasis: Advanced Communication</td>
<td>3</td>
</tr>
<tr>
<td>Open Electives</td>
<td>6</td>
</tr>
<tr>
<td><strong>Credits</strong></td>
<td><strong>19</strong></td>
</tr>
</tbody>
</table>

#### Junior Year

<table>
<thead>
<tr>
<th>Fall</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 410</td>
<td>Empirical Methods in Economics I</td>
</tr>
<tr>
<td>Essential Studies: Global Diversity</td>
<td>3</td>
</tr>
<tr>
<td>Electives in Economics</td>
<td>3</td>
</tr>
<tr>
<td>Open Electives</td>
<td>6</td>
</tr>
<tr>
<td><strong>Credits</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Electives in Economics</td>
<td>3</td>
</tr>
<tr>
<td>Open Electives</td>
<td>9</td>
</tr>
<tr>
<td>ECON 338</td>
<td>International Economics</td>
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<tr>
<td><strong>Credits</strong></td>
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</table>

#### Senior Year

<table>
<thead>
<tr>
<th>Fall</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Electives in Economics</td>
<td>3</td>
</tr>
<tr>
<td>Open Electives</td>
<td>12</td>
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<tr>
<td><strong>Credits</strong></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Electives in Economics</td>
<td>3</td>
</tr>
<tr>
<td>Open Electives</td>
<td>9</td>
</tr>
<tr>
<td>Essential Studies Capstone</td>
<td>3</td>
</tr>
<tr>
<td><strong>Credits</strong></td>
<td><strong>13</strong></td>
</tr>
</tbody>
</table>

| Total Credits | 120-121 |

This plan of study represents just one way in which a student can complete the requirements for the Bachelor of Science in Criminal Justice Studies within four years. Because of the large number of ways to complete the degree requirements for this major, students should always consult their adviser for assistance regarding their specific plan of study.

You must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)
Electives in Economics 3 
Credits 15 
Total Credits 125 

In place of Economics Electives, interested students may select electives from Option B, which includes math classes for the quantitative option. Students must pay attention to the number of credits at courses numbered 300 or above for graduation. 

You must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)

English 

B.A. with Major in English (p. 232) 
B.A. with Major in English - Teacher Licensure 

B.A. with Major in English 

Freshman Year 
First Semester 
Language 101 4 
The English major requires Level II proficiency in a language other than English. Students may meet this requirement through coursework or equivalent language testing. We recommend starting early on the language requirement, though students may opt to begin the sequence after the Freshman year. 
Electives/Essential Studies 8 
ENGL 110 College Composition I 3 
Credits 15 

Second Semester 
Language 102 4 
Electives/Essential Studies 8 
ENGL 130 Composition II: Writing for Public Audiences 3 
Credits 15 

Sophomore Year 
First Semester 
ENGL 271 Reading and Writing about Texts 3 
ENGL 301 Survey of English Literature I 3 
or ENGL 303 or Survey of American Literature 3 
Students are required to take one of the two-course 300-level surveys. While we recommend fulfilling that requirement early, students may opt to take these courses later in their career 
Electives/Essential Studies 9 
Credits 15 

Second Semester 
ENGL 302 or ENGL 304 Survey of English Literature II or Survey of American Literature 3 
ENGL 272 Introduction to Literary Criticism 3 
Electives/Essential Studies 9 
Credits 15 

Junior Year 
First Semester 
Electives/Essential Studies 9 
English Electives 6 
One English elective needs to satisfy the historical requirement for the major and focus on the literature of an earlier historical period 
Credits 15 

Second Semester 
Electives/Essential Studies 9 

English Electives 

Senior Year 
First Semester 
ENGL 415 Seminar in Literature 3 
Credits 15 
Second Semester 
ENGL 4XX 3 
Credits 15 
Total Credits 120 

The English major is flexible and this plan of study offers only one possible path through the major. One of the advantages of a liberal arts education is the ability for students to take courses in a wide variety of areas, and we encourage English majors to explore other fields. All students should meet with their advisers regularly to chart a personalized course of study that best fits with their interests and needs.

You must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)

B.A. with Major in English - Teacher Licensure 

Freshman Year 
Fall 
Language 101 4 
The English major requires Level II proficiency in a language other than English. Students may meet this requirement through coursework or equivalent language testing. We recommend starting early on the language requirement, though students may opt to begin the sequence after their Freshman year. 
ENGL 110 College Composition I 3 
Electives/Essential Studies 8 
Credits 15 

Spring 
Language 102 4 
Electives/Essential Studies 8 
ENGL 130 Composition II: Writing for Public Audiences 3 
Credits 15 

Sophomore Year 
Fall 
ENGL 271 Reading and Writing about Texts 3 
ENGL 301 Survey of English Literature I 3 
or ENGL 303 or Survey of American Literature 3 
One English elective needs to satisfy the historical requirement for the major and focus on the literature of an earlier historical period 
T&L 250 Introduction to Education 3 
Praxis 1 exam should be taken this semester 
ENGL 271 Reading and Writing about Texts 3 
ENGL 301 Survey of English Literature I 3 
or ENGL 303 or Survey of American Literature 3 
Students are required to talk one of the two-course 300-level surveys. While we recommend fulfilling that requirement early, students may opt to take these courses later in their career 
Credits 15 

Spring 
Electives/Essential Studies 6 
ENGL 272 Introduction to Literary Criticism 3 
ENGL 302 Survey of English Literature II 3 
or ENGL 304 or Survey of American Literature 3 
Credits 15 
Total Credits 120
The English major is flexible and this plan of study offers only one possible path through the major with teacher licensure. One of the advantages of a liberal arts education is the ability for students to take courses in a wide variety of areas, and we encourage English majors to explore other fields. All students should meet with their advisers regularly to chart a personalized course of study that best fits with their interests and needs.

You must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)

### Environmental Studies

**B.S. with Major in Environmental Studies**

**B.A. with Major in Environmental Studies**

### Freshman Year

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 150</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 150L</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 121</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 121L</td>
<td>1</td>
</tr>
<tr>
<td>ENGL 110</td>
<td>3</td>
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</table>

### Sophomore Year

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHIL 253</td>
<td>3</td>
</tr>
<tr>
<td>Environmental Studies Elective: Natural Systems</td>
<td>3-4</td>
</tr>
<tr>
<td>Environmental Studies Elective: Social Science and Policy</td>
<td>3</td>
</tr>
<tr>
<td>Essential Studies Electives</td>
<td>6</td>
</tr>
</tbody>
</table>

### Junior Year

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Studies Elective: Natural Systems</td>
<td>3</td>
</tr>
<tr>
<td>Environmental Studies Elective: Techniques and Methods</td>
<td>3</td>
</tr>
<tr>
<td>Environmental Studies Elective: Humanities</td>
<td>3</td>
</tr>
<tr>
<td>Essential Studies Electives</td>
<td>6</td>
</tr>
</tbody>
</table>

### Senior Year

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Studies Elective: Techniques and Methods</td>
<td>3</td>
</tr>
<tr>
<td>Environmental Studies Elective: Natural Systems</td>
<td>3</td>
</tr>
<tr>
<td>Environmental Studies Elective: General Electives</td>
<td>12</td>
</tr>
</tbody>
</table>

| (courses that build on your Environmental Studies major focus, 300 or above. Please work with your advisor to choose the appropriate courses) | |

### Credits

- Total Credits: 120

### Resources

- Conservation and Sustainable Use of Natural Resources
- Environmental Ethics
- Global Physical Environment
- Multicultural Education
- Praxis 2 exam should be taken this semester (or the summer before)

### University of North Dakota

- 233

### Second Semester

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 454</td>
<td>3</td>
</tr>
<tr>
<td>Environmental Studies Elective: General Electives</td>
<td>12</td>
</tr>
</tbody>
</table>

| (courses that build on your Environmental Studies major focus, 300 or above. Please work with your advisor to choose the appropriate courses) | |

### Credits

- Total Credits: 120-122
### Forensic Science

#### B.S. with Major in Forensic Science Evidence Analyst Track

**Freshman Year**

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 150 &amp; 150L</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 121 &amp; 121L</td>
<td>4</td>
</tr>
<tr>
<td>ENGL 110</td>
<td>3</td>
</tr>
<tr>
<td>FS 120</td>
<td>3</td>
</tr>
<tr>
<td>MATH 103</td>
<td>3</td>
</tr>
<tr>
<td><strong>Credits</strong></td>
<td><strong>17</strong></td>
</tr>
</tbody>
</table>

**Spring**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 151 &amp; 151L</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 122 &amp; 122L</td>
<td>4</td>
</tr>
<tr>
<td>ENGL 130</td>
<td>3</td>
</tr>
<tr>
<td>JU 201</td>
<td>3</td>
</tr>
<tr>
<td><strong>Credits</strong></td>
<td><strong>17</strong></td>
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#### Sophomore Year

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>COMM 110</td>
<td>3</td>
</tr>
<tr>
<td>A&amp;S 260</td>
<td>3</td>
</tr>
<tr>
<td>ES Social Science</td>
<td>3</td>
</tr>
<tr>
<td>ES Fine Art</td>
<td>3</td>
</tr>
<tr>
<td><strong>Credits</strong></td>
<td><strong>15</strong></td>
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</table>

**Spring**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 340 &amp; 340L</td>
<td>5</td>
</tr>
<tr>
<td>PHIL 120</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 470 or SOC 326 or PSYC 241</td>
<td>4</td>
</tr>
<tr>
<td>ES FA/HUM</td>
<td>3</td>
</tr>
<tr>
<td><strong>Credits</strong></td>
<td><strong>15</strong></td>
</tr>
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</table>

#### Junior Year

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>FS 345</td>
<td>3</td>
</tr>
<tr>
<td>CJ 352</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 161</td>
<td>4</td>
</tr>
<tr>
<td><strong>Course for sub-plan or elective</strong></td>
<td><strong>3</strong></td>
</tr>
<tr>
<td><strong>Credits</strong></td>
<td><strong>13</strong></td>
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**Spring**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>FS 346</td>
<td>3</td>
</tr>
<tr>
<td>CJ 342</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 162</td>
<td>4</td>
</tr>
<tr>
<td><strong>Course for sub-plan or elective</strong></td>
<td><strong>3</strong></td>
</tr>
<tr>
<td><strong>Credits</strong></td>
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#### Senior Year

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>-general electives</td>
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<tr>
<td>ES Social Science</td>
<td>3</td>
</tr>
<tr>
<td>ES Fine Art</td>
<td>3</td>
</tr>
<tr>
<td><strong>Credits</strong></td>
<td><strong>15</strong></td>
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**Spring**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>-general electives</td>
<td></td>
</tr>
<tr>
<td>ES Social Science</td>
<td>3</td>
</tr>
<tr>
<td>ES Fine Art</td>
<td>3</td>
</tr>
<tr>
<td><strong>Credits</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>
### Senior Year

**Fall**

Courses for sub-plan or electives 15

Credits 15

**Spring**

FS 400 Forensic Science Applied Experiences 3

Courses for sub-plan or electives 12

ES Social Science if not yet completed 3

Credits 18

Total Credits 123

This plan is an example. Students should consult with their advisor when registering for classes.

Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)

### B.S. with Major in Forensic Science Evidence Technician Track

#### Freshman Year

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 150 General Biology I</td>
<td>4</td>
</tr>
<tr>
<td>&amp; 150L General Biology I Laboratory</td>
<td></td>
</tr>
<tr>
<td>CHEM 121 General Chemistry I</td>
<td>4</td>
</tr>
<tr>
<td>&amp; 121L General Chemistry I Laboratory</td>
<td></td>
</tr>
<tr>
<td>ENGL 110 College Composition I</td>
<td>3</td>
</tr>
<tr>
<td>COMM 110 Fundamentals of Public Speaking</td>
<td>3</td>
</tr>
<tr>
<td>Essential Studies/Program Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>17</strong></td>
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**Spring**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>BIOL 151 General Biology II</td>
<td>4</td>
</tr>
<tr>
<td>&amp; 151L General Biology II Laboratory</td>
<td></td>
</tr>
<tr>
<td>CHEM 122 General Chemistry II</td>
<td>4</td>
</tr>
<tr>
<td>&amp; 122L General Chemistry II Laboratory</td>
<td></td>
</tr>
<tr>
<td>ENGL 130 Composition II: Writing for Public Audiences</td>
<td>3</td>
</tr>
<tr>
<td>Essential Studies/Program Electives</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>17</strong></td>
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</tbody>
</table>

#### Sophomore Year

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CHEM 340 Survey of Organic Chemistry</td>
<td>5</td>
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<tr>
<td>&amp; 340L Survey of Organic Chemistry Laboratory</td>
<td></td>
</tr>
<tr>
<td>CJ 201 Introduction to Criminal Justice</td>
<td>3</td>
</tr>
<tr>
<td>Essential Studies/Program Electives</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>14</strong></td>
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**Spring**

<table>
<thead>
<tr>
<th>Course</th>
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</thead>
<tbody>
<tr>
<td>CJ 210 Introduction to Policing</td>
<td>3</td>
</tr>
<tr>
<td>Statistics Course</td>
<td>3</td>
</tr>
<tr>
<td>Essential Studies/Program Electives</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>12</strong></td>
</tr>
</tbody>
</table>

#### Junior Year

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANTH 345</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 333 Analytical Chemistry</td>
<td>4</td>
</tr>
<tr>
<td>&amp; 333L Analytical Chemistry Laboratory</td>
<td></td>
</tr>
<tr>
<td>PHYS 161 Introductory College Physics I</td>
<td>4</td>
</tr>
<tr>
<td>Essential Studies/Program Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>14</strong></td>
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</tbody>
</table>

**Spring**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANTH 346</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 162 Introductory College Physics II</td>
<td>4</td>
</tr>
<tr>
<td>Ethics Course</td>
<td>3</td>
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<tr>
<td><strong>Total Credits</strong></td>
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</table>

### Essential Studies/Program Electives

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.S. with Major in Forensic Science Evidence Technician Track</td>
<td>6</td>
</tr>
</tbody>
</table>

**Total Credits** 123

#### Senior Year

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CJ 352 Criminal Investigation</td>
<td>3</td>
</tr>
<tr>
<td>Essential Studies/Program Electives</td>
<td>12</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

**Spring**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CJ 342 Criminal Procedure</td>
<td>3</td>
</tr>
<tr>
<td>Essential Studies Capstone</td>
<td>3</td>
</tr>
<tr>
<td>Essential Studies/Program Electives</td>
<td>9</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

**Total Credits** 120

This plan is an example. Students should consult their adviser when registering for classes.

You must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)

### Geography

**B.S. with Major in Geography - Community and Urban Development Emphasis** (p. 235)

**B.S. with Major in Geography - Environmental Geography Emphasis**

**B.S. with Major in Geography - Geographic Education Emphasis - Teacher Licensure**

#### B.S. with Major in Geography - Community and Urban Development Emphasis

**Freshman Year**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 151 Human Geography</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 110 College Composition I</td>
<td>3</td>
</tr>
<tr>
<td>COMM 110 Fundamentals of Public Speaking</td>
<td>3</td>
</tr>
<tr>
<td>Geography Electives (from Economics, Finance, Public Administration, Anthropology, Sociology, History and/or other social sciences)</td>
<td>3</td>
</tr>
<tr>
<td>Essential Studies Elective: Social Science</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 162 Global Physical Environment</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 121L Global Physical Environment Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>GEOG 161 World Regional Geography</td>
<td>3</td>
</tr>
<tr>
<td>Geography Elective (from Geography, Economics, Finance, Public Administration, Anthropology, Sociology, History and/or other social sciences)</td>
<td>3</td>
</tr>
<tr>
<td>Essential Studies Elective: Math, Science and Technology--other than Geography</td>
<td>3</td>
</tr>
<tr>
<td>Essential Studies Elective: Fine Arts and Humanities</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>16</strong></td>
</tr>
</tbody>
</table>

**Second Semester**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>GEOG 262 Geography of North America I (or other geography course in consultation with advisor)</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 130 Composition II: Writing for Public Audiences</td>
<td>3</td>
</tr>
<tr>
<td>Essential Studies Elective: Fine Arts and Humanities</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Credits** 120

This plan is an example. Students should consult their adviser when registering for classes.

You must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)
History 104, US History, will count toward the US Diversity as well as the Humanities area. Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)

### B.S. with Major in Geography - Environmental Geography Emphasis

#### Freshman Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credits</th>
<th>Fall</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>3</td>
<td>GEOG 121 Global Physical Environment</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GEOG 121L Global Physical Environment Laboratory</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ENGL 110 College Composition I</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>COMM 110 Fundamentals of Public Speaking</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Geography Electives</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(from Atmospheric Science, Biology, Chemistry, Computer Science, Civil Engineering, Geology and Geological Engineering, Math and/or Physics)</td>
<td></td>
</tr>
<tr>
<td>Spring</td>
<td>16</td>
<td>GEOG 151 Human Geography</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GEOG 161 World Regional Geography</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Essential Studies Elective</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(from Social Sciences--other than Geography)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Essential Studies Elective</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(from Fine Arts and Humanities)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Geography Elective</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(from Atmospheric Science, Biology, Chemistry, Computer Science, Civil Engineering, Geology and Geological Engineering, Math and/or Physics)</td>
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</tr>
</tbody>
</table>

#### Sophomore Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credits</th>
<th>Fall</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>15</td>
<td>GEOG 262 Geography of North America I (or any approved Essential Studies course that carries U.S. Diversity (U) credit)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Geography Elective</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(from Atmospheric Science, Biology, Chemistry, Computer Science, Civil Engineering, Geology and Geological Engineering, Math and/or Physics)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>ENGL 130 Composition II: Writing for Public Audiences</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Essential Studies Elective</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(from Fine Arts and Humanities)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>General Elective</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(from Geography or another department--see your advisor for a list of recommended courses)</td>
<td></td>
</tr>
<tr>
<td>Spring</td>
<td>11</td>
<td>General Electives</td>
<td>11</td>
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<tr>
<td></td>
<td></td>
<td>(from Geography or another department--see your advisor for a list of recommended courses)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Essential Studies Elective</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(from Fine Arts and Humanities)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>General Elective</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(from Geography or another department--see your advisor for a list of recommended courses)</td>
<td></td>
</tr>
</tbody>
</table>

#### Junior Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credits</th>
<th>Fall</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>14</td>
<td>GEOG 471 Cartography and Visualization</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GEOG 471L Cartography and Visualization Laboratory</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GEOG 322 Environmental Hazards</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>or GEOG 421 or Selected Topics in Physical Geography</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>GEOG 374 Environmental Remote Sensing</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>or GEOG 352 or Economic Geography</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>GEOG 374L Environmental Remote Sensing Laboratory</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Only if taking GEOG 374)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>General Electives</td>
<td>6</td>
</tr>
</tbody>
</table>

You must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)
Education Emphasis - Teacher Licensure

B.S. with Major in Geography - Geographic Education Emphasis - Teacher Licensure

Freshman Year

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 151 Human Geography</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 161 World Regional Geography</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 110 College Composition</td>
<td>3</td>
</tr>
<tr>
<td>COMM 110 Fundamentals of Public Speaking</td>
<td>3</td>
</tr>
<tr>
<td>Essential Studies Elective</td>
<td>3</td>
</tr>
<tr>
<td>(from Social Sciences--other than Geography)</td>
<td></td>
</tr>
<tr>
<td>Note: Geography students seeking secondary licensure must have a geography education adviser in the Geography Department and an adviser in the Department of Teaching and Learning.</td>
<td></td>
</tr>
</tbody>
</table>

| Credits | 15 |

Second Semester

<table>
<thead>
<tr>
<th>GEOG 121 Global Physical Environment</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 121L Global Physical Environment Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>ENGL 130 Composition II: Writing for Public Audiences</td>
<td>3</td>
</tr>
<tr>
<td>Essential Studies Electives</td>
<td>9</td>
</tr>
</tbody>
</table>

| Credits | 15 |

You must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area).

You must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)

| Credits | 15 |

| Total Credits | 120 |

Sophomore Year

First Semester

<table>
<thead>
<tr>
<th>GEOG 271 The Power of Maps</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 352 Economic Geography</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 377 Quantitative Applications in Geography</td>
<td>2</td>
</tr>
<tr>
<td>GEOG 377L Spatial Analysis Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>Essential Studies Elective</td>
<td>3</td>
</tr>
<tr>
<td>(from Math, Science and Technology)</td>
<td></td>
</tr>
<tr>
<td>Essential Studies Elective</td>
<td>3</td>
</tr>
<tr>
<td>(from Fine Arts and Humanities)</td>
<td></td>
</tr>
<tr>
<td>Credits</td>
<td>16</td>
</tr>
</tbody>
</table>

Senior Year

Fall

| GEOG 377 Quantitative Applications in Geography | 2 |
| GEOG 377L Spatial Analysis Laboratory | 1 |
| General Electives | 12 |

| Credits | 15 |

| Total Credits | 120 |

Spring

| GEOG 454 Conservation and Sustainable Use of Natural Resources | 3 |
| General Electives | 12 |

| Credits | 15 |

| Total Credits | 120 |

Second Semester

| T&L 250 Introduction to Education | 3 |
| Essential Studies Elective | 4 |
| (from Math, Science and Technology--recommended are GEOG 134 and 134L) |         |
| Geography Electives | 7 |
| (From the list of approved Geography electives for Education Emphasis--see your advisor for recommendations) |         |
| General Electives | 3 |
| (from Geography or another department--see your advisor for list of recommended courses) |         |
| Credits | 14 |

Junior Year

First Semester

| T&L 339 Educational Technology | 2 |
| T&L 345 Curriculum, Instruction, and Assessment | 3 |
| T&L 350 Development and Education of the Adolescent | 3 |
| Geography Electives | 3 |
| (from the list of approved Geography electives for Education Emphasis--see your advisor for recommendations) |         |
| General Electives | 6 |
| (from Geography or another department--see your advisor for list of recommended courses) |         |
| Credits | 14 |

Second Semester

| GEOG 386 Geography Education Field Placement | 1-3 |
| GEOG 419 Methods and Materials of Teaching Middle and Secondary School in Geographic Education | 3 |
| T&L 432 Learning Environments | 3 |
| T&L 486 Field Experience | 1-4 |
| General Electives | 6 |
| (from Geography or another department--see your advisor for list of recommended courses) |         |
| Credits | 14-19 |

Senior Year

First Semester

| T&L 433 Multicultural Education | 3 |
| T&L 319 Integrating Diverse Needs in Educational Settings | 3 |
| General Electives | 9 |
| (from Geography or another department--see your advisor for list of recommended courses) |         |
| Credits | 15 |

Second Semester

| T&L 487 Student Teaching | 13 |
| T&L 488 Senior Seminar | 1 |
| GEOG 454 Conservation and Sustainable Use of Natural Resources | 3 |
| Credits | 17 |

| Total Credits | 120-125 |

You must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement.
Graphic Design and New Art Media

B.F.A. with Major in Graphic Design and New Art Media

<table>
<thead>
<tr>
<th>Freshman Year</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
</tr>
<tr>
<td>ART 112 Two &amp; Three Dimensional Design</td>
<td>3</td>
</tr>
<tr>
<td>ART 114 Art &amp; Design: First Year Seminar</td>
<td>3</td>
</tr>
<tr>
<td>ART 210 History of Art I</td>
<td>3</td>
</tr>
<tr>
<td>Essential Studies Elective</td>
<td>3</td>
</tr>
<tr>
<td>Essential Studies Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>Credits</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ART 130 Drawing I</td>
<td>3</td>
</tr>
<tr>
<td>ART 211 History of Art II</td>
<td>3</td>
</tr>
<tr>
<td>ART 273 Intro to Graphic Design</td>
<td>3</td>
</tr>
<tr>
<td>Essential Studies Elective</td>
<td>3</td>
</tr>
<tr>
<td>Essential Studies Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>Credits</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sophomore Year</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
</tr>
<tr>
<td>ART 230 Intro to Drawing</td>
<td>3</td>
</tr>
<tr>
<td>ART 240 Intro to Printmaking</td>
<td>3</td>
</tr>
<tr>
<td>ART 260 Intro to Color Photography</td>
<td>3</td>
</tr>
<tr>
<td>ART 382 Typography</td>
<td>3</td>
</tr>
<tr>
<td>Essential Studies Elective</td>
<td>3</td>
</tr>
<tr>
<td>Essential Studies Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>Credits</strong></td>
<td><strong>15</strong></td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Junior Year</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
</tr>
<tr>
<td>200-300 Level Studio Art Course</td>
<td>3</td>
</tr>
<tr>
<td>400 Level Art History</td>
<td>3</td>
</tr>
<tr>
<td>ART 480 Advanced Graphic Design</td>
<td>3</td>
</tr>
<tr>
<td>Essential Studies Elective</td>
<td>3</td>
</tr>
<tr>
<td>Essential Studies Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>Credits</strong></td>
<td><strong>15</strong></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>ART 413 History of Graphic Design</td>
<td>3</td>
</tr>
<tr>
<td>ART 480 Advanced Graphic Design</td>
<td>3</td>
</tr>
<tr>
<td>400 Level Graphic Design Course</td>
<td>3</td>
</tr>
<tr>
<td>ART 494 Professional Exhibition</td>
<td>3</td>
</tr>
<tr>
<td>Essential Studies Elective</td>
<td>3</td>
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<td><strong>Credits</strong></td>
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Annual BFA Review

<table>
<thead>
<tr>
<th>Senior Year</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
</tr>
<tr>
<td>400 Level Art History</td>
<td>3</td>
</tr>
<tr>
<td>ART 481 Art &amp; Design Internship</td>
<td>3</td>
</tr>
<tr>
<td>400 Level Graphic Design Course</td>
<td>3</td>
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<tr>
<td>300-400 Level Studio Art or Art History</td>
<td>3</td>
</tr>
<tr>
<td>Essential Studies Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>Credits</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>300-400 Level Studio Art or Art History</td>
<td>3</td>
</tr>
<tr>
<td>300-400 Level Studio Art or Art History</td>
<td>3</td>
</tr>
<tr>
<td>ART 480 Advanced Graphic Design</td>
<td>3</td>
</tr>
<tr>
<td>ART 498 Seminar in Art and Design Capstone</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>BFA Art Exhibition</td>
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</tr>
<tr>
<td>400 Level Art History</td>
<td>3</td>
</tr>
<tr>
<td><strong>Credits</strong></td>
<td><strong>15</strong></td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>120</strong></td>
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</table>

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History

B.A. with Major in History

<table>
<thead>
<tr>
<th>Freshman Year</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
</tr>
<tr>
<td>HIST 101</td>
<td>Western Civilization I (Speak with adviser before registering)</td>
</tr>
<tr>
<td>or HIST 102</td>
<td>or Western Civilization II</td>
</tr>
<tr>
<td>or HIST 103</td>
<td>or United States to 1877</td>
</tr>
<tr>
<td>or HIST 104</td>
<td>or United States since 1877</td>
</tr>
<tr>
<td>or HIST 105</td>
<td>or World Civilizations I</td>
</tr>
<tr>
<td>or HIST 106</td>
<td>or World Civilizations II</td>
</tr>
<tr>
<td>Essential Studies</td>
<td>9-10</td>
</tr>
<tr>
<td>Open Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>Credits</strong></td>
<td><strong>15-16</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>HIST 102</td>
<td>Western Civilization II</td>
</tr>
<tr>
<td>or HIST 101</td>
<td>or Western Civilization I</td>
</tr>
<tr>
<td>or HIST 103</td>
<td>or United States to 1877</td>
</tr>
<tr>
<td>or HIST 104</td>
<td>or United States since 1877</td>
</tr>
<tr>
<td>or HIST 105</td>
<td>or World Civilizations I</td>
</tr>
<tr>
<td>or HIST 106</td>
<td>or World Civilizations II</td>
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<tr>
<td>Essential Studies</td>
<td>6-7</td>
</tr>
<tr>
<td>Open Electives</td>
<td>6</td>
</tr>
<tr>
<td><strong>Credits</strong></td>
<td><strong>15-16</strong></td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Sophomore Year</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
</tr>
<tr>
<td>HIST 240</td>
<td>The Historian’s Craft (Speak with adviser before registering for classes)</td>
</tr>
<tr>
<td>Essential Studies</td>
<td>6-7</td>
</tr>
<tr>
<td>Open Electives</td>
<td>6</td>
</tr>
<tr>
<td><strong>Credits</strong></td>
<td><strong>15-16</strong></td>
</tr>
</tbody>
</table>

You must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)
Spring
North American History Course  See options in course catalog  3
World History Course  See options in course catalog  3
Essential Studies  6-7
Open Electives  3
Credits  15-16

Junior Year
Fall
European History Course  See options in course catalog  3
Essential Studies  6-7
Open Electives  6
Credits  15-16

Spring
History 300 or 400 level elective  Speak with your adviser before registering for classes.  3
North American History Course  See options in course catalog  3
Essential Studies  3-4
Open Electives  6
Credits  15-16

Senior Year
Fall
HIST 440 Research Capstone  Speak with your adviser before registering for classes.  3
European History Course  See options in course catalog  3
Open Electives  9
Credits  15-16

Spring
History 300 or 400 level elective  Speak with your adviser before registering for classes.  3
Open Electives  12
Credits  15

Total Credits  120-126

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Honors

B.A. or B.S. in Honors

First Year
Summer Study Abroad - optional  0
Fall HON 101 Research Scholars Cornerstone  3
or HON 102 Leaders in Action Cornerstone  3
or HON 103 Inquiry in the Sciences  3
Only one course from HON 101, 102, or 103 is allowed.
Essential Studies requirements, Second Major requirements, or other areas of interest.  9
Optional: Honors sections of the following courses may be taken in conjunction with an Honors Inquiry course: BIOL 150L, COMM 110, ENGL 130, or PSYC 111.  3
Credits  15

Second Year
Summer Study Abroad - optional  0
Fall HON 292 Colloquium in Social Science  3
or HON 291 Colloquium in the Humanities  3
or HON 293 Colloquium in the Sciences  3
Essential Studies requirements, Second Major requirements, or other areas of interest.  12
Credits  15

Third Year
First Semester HON 391 Advanced Colloquium in the Humanities  3
or HON 372 Advanced Social Science Colloquium on US Diversity  3
or HON 392 Advanced Colloquium in the Social Sciences  3
or HON 393 Advanced Colloquium in the Sciences  3
Essential Studies Requirements/Second Major Requirements/Other areas of interest  12
Credits  15

Second Semester HON 395 Prospectus Development  1
Optional: Advanced Colloquium  1
Essential Studies Requirements/Second Major Requirements/Other areas of interest  15
Credits  16

Fourth Year
First Semester HON 489 Senior Project: Honors Research  4-5
Optional: Advanced Colloquium  1
Second Major Requirements/Other areas of Interest  10-12
Credits  14-17

Second Semester HON 489: Senior Honors Thesis  5-4
Remaining Requirements in Second Major or Essential Studies  9-10
This is an example of ONE Possible course of study but is not the only course of study that could be used to complete graduation/degree requirements in 4 years. It is essential that Honors students meet with their adviser at least once per semester to determine the best selection of courses. A student may receive a B.A. or B.S. in Honors depending on their second major and/or the field of concentration of the majority of their courses. Students may enter the Honors Program after their first or second semester, transfer students are welcome in the program. These students should visit with an Honors adviser to plan an individualized course of study.

Every student must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)

Instrumental Performance

B.M. with a Major in Instrumental Performance (Even Fall Entry)

B.M. with a Major in Instrumental Performance (Odd Fall Entry)

B.M. with a Major in Instrumental Performance - Piano (Even Fall Entry)

B.M. with a Major in Instrumental Performance (Even Fall Entry)

<table>
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<tbody>
<tr>
<td>MUSC 130</td>
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<td>or MUSC 150</td>
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<td>ENGL 110</td>
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| Credits | 15 |

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<td>or MUSC 150</td>
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| Credits | 16 |

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| Credits | 16 |

| Fall |
| MUSC 203 | Music and Culture | 3 |
| MUSC 234 | Music Theory IV: Music Theory since 1900 | 3 |
| MUSC 235 | Aural Skills IV | 1 |
| MUSC 255 | Individual Lessons | 2 |
| MUSC 254 | Individual Lessons | 1 |
| MUSC 278 | Seminar for Collaborative Piano  | 1 |
| Essential Studies Social Science | 3 |
| Electives | 2 |

| Credits | 16 |

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| Credits | 16 |

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| Credits | 15 |

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| Credits | 15-16 |

| Total Credits | 125-126 |

1 = On Piano. 2 = On Secondary Instrument. 3 = Or Major Ensemble - Consult Advisor.

You must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)
B.M. with a Major in Instrumental Performance
(Odd Fall Entry)

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<td>MUSC 131</td>
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<td>MUSC 154</td>
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<td>or MUSC 150</td>
<td>or Class Lessons</td>
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| ENGL 110      | College Composition I | 3       |
| Essential Studies Lab Science | 4 |

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| ENGL 130      | Composition II: Writing for Public Audiences | 3       |
| Essential Studies Math/Science/Technology | 3 |
| Electives     |         | 2       |

| Credits       |         | 16      |

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| Essential Studies Fine Arts/Humanities (Non-Music) | 3 |

| Credits       |         | 16      |

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<td>MUSC 203</td>
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| Credits       |         | 16      |

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<td>MUSC 310</td>
<td>Music History Survey I</td>
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<td>MUSC 355</td>
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<td>MUSC 278</td>
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<td>MUSC 277</td>
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<td>Music Elective</td>
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| Credits       |         | 15      |

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<td>MUSC 278</td>
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<td>MUSC 277</td>
<td>Chamber Music Groups</td>
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<td>MUSC 359</td>
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<td>MUSC 414</td>
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| Credits       |         | 15      |

B.M. with a Major in Instrumental Performance
- Piano (Even Fall Entry)

<table>
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<th>Credits</th>
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<td>MUSC 130</td>
<td>Music Theory I</td>
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<td>MUSC 154</td>
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| Essential Studies Math/Science/Technology | 3 |

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<tbody>
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<td>MUSC 134</td>
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| Essential Studies Math/Science/Technology | 3 |
| Electives |         | 2       |

| Credits       |         | 16      |

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<tr>
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<td>MUSC 359</td>
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<td>MUSC 414</td>
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| Credits       |         | 15      |

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<td>MUSC 278</td>
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| Credits       |         | 16      |

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International Studies

B.A. with a Major in International Studies

Freshman Year

Fall
- LANG 101: First Year Foreign Language I (Take language placement test or enroll 101 in the foreign language of choice.) Level IV in one foreign language, plus two upper-division courses required. OR Level IV in one language and Level II in another. Students may fulfill all or part of this requirement during study abroad. 4 Credits
- Regional and Thematic Concentration: see adviser to determine course(s) 3 Credits
- Essential Studies Courses: See adviser for list of ES courses. 8 Credits

Spring
- LANG 102: First Year Foreign Language II 4 Credits
- Regional and Thematic Concentration: see adviser 3 Credits
- Essential Studies Courses 8 Credits

Sophomore Year

Fall
- LANG 380: Global Gateways can also be taken in the spring semester 3 Credits
- LANG 201: Second Year Foreign Language I 4 Credits
- Regional Diversity: see adviser 3 Credits
- Essential Studies Courses: See adviser for list of ES courses. 5 Credits

Spring
- LANG 202: Second Year Foreign Language II 4 Credits
- LANG 380: Global Gateways if not taken in the fall semester 3 Credits
- Regional and Thematic Concentration 3 Credits

Junior Year

Fall
- LANG 318: Individual Arranged Study Abroad (Students are required to take 6-12 credits of UND-approved study abroad.) See adviser and visit International Centre to find appropriate study abroad experience. 12 Credits
- Essential Studies/General Elective courses 3 Credits

Spring
- Regional and Thematic Concentration 3 Credits
- Essential Studies/General Elective courses 12 Credits

Senior Year

Fall
- LANG 480: Capstone: Global Connections can be taken in spring of senior year 3 Credits
- Regional and Thematic Concentration 3 Credits
- Essential Studies/General Elective courses 9 Credits

Spring
- LANG 480: Capstone: Global Connections if not taken in fall semester 3 Credits
- Regional and Thematic Concentration 3 Credits

You must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)
Languages

B.A. with Major in Language: Chinese Studies
B.A. with Major in Language: Classical Studies
B.A. with Major in Language: French
B.A. with Major in Language: German Studies
B.A. with Major in Language: Norwegian
B.A. with Major in Language: Spanish

B.A. with Major in Language: Chinese Studies

Freshman Year

Fall
CHIN 101  First Year Chinese I  4

Credits  11

Essential Studies/Electives

Spring
CHIN 102  First Year Chinese II  4

Credits  11

Essential Studies/Electives

Sophomore Year

Fall
CHIN 201  Second Year Chinese I  4

Credits  11

Essential Studies/Electives

Spring
CHIN 202  Second Year Chinese II  4
BADM 316  Introduction to Business in China  3

Credits  15

Essential Studies/Electives

Students are strongly encouraged to study abroad for a summer, semester, or year. Please speak with your adviser to help plan this worthwhile educational experience.

Credits  15

Junior Year

Fall
CHIN 305  or CHIN 312  Chinese Culture Through Films or Modern Chinese Literature in Translation  3
CHIN 405  or Topics in Chinese Culture  or Traditional Chinese Literature in Translation  3
LANG 380  Global Gateways (or could be taken in spring of junior year)  3

Essential Studies/Electives  9

Credits  15

Spring
CHIN 306  or CHIN 312  Introduction to Chinese Calligraphy or Modern China  3
or CHIN 406  or Modern Chinese Literature in Translation  3
or HIST 362  or Modern China  3

Essential Studies/Electives  12

Credits  15

Senior Year

Fall
CHIN 305  Chinese Culture Through Films  3
or CHIN 312  or CHIN 405  or Traditional Chinese Literature in Translation  3

Credits  15

Spring
CHIN 306  Introduction to Chinese Calligraphy  3
or CHIN 312  or CHIN 406  or Modern Chinese Literature in Translation  3
or HIST 362  or Modern China  3

Essential Studies/Electives  9

Credits  15

Total Credits  120

This plan is only an example as there are multiple other classes offered in Languages and other departments that could be substituted for the 18 area studies credits. It is highly recommended that any student interested in a Chinese Studies major see a faculty member for an individualized plan. This is also true for those students who start the major after their Freshman year.

You must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)
### Sophomore Year

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### Spring

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### Junior Year

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### Senior Year

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### Essential Studies/Electives

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This is only an example. It is highly recommended that any student interested in a Classical Studies major see a faculty member for an individualized plan. This is also true for those students who start the major after their Freshman year.

You must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)

### B.A. with Major in Language: French

#### Freshman Year

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B.A. with Major in Language: German Studies

Freshman Year

Fall
- GERM 101 First Year German I 4
- Essential Studies/Electives 11
  Credits 15

Spring
- GERM 102 First Year German II 4
- Essential Studies/Electives 11
  Credits 15

Sophomore Year

Fall
- GERM 201 Second Year German I 4
- GERM 206 Germany in a Global World 3
  or GERM 306 or GERM 406
  or Contextualizing Culture: Introduction to German Studies
  or Literary Voices in Translation
- Essential Studies/Electives 8
  Credits 15

Spring
- GERM 202 Second Year German II 4
- Essential Studies/Electives 11
  Credits 15

Students are strongly encouraged to study abroad for a summer, semester, or year during their studies. Please see your adviser to discuss and plan for this worthwhile educational experience.

Junior Year

Fall
- GERM 307 Communicating Cultures I 3
- 300-level German Studies elective 3
- LANG 380 Global Gateways (can be taken in spring of Junior year) 3
- Essential Studies/Electives 6
  Credits 15

Spring
- GERM 308 Communicating Cultures II 3
- 300-level German Studies elective 3
- Essential Studies/Electives 9
  Credits 15

Senior Year

Fall
- 400-level German Studies elective 3
- LANG 480 Capstone: Global Connections (can be taken in spring of Senior year) 3
- Essential Studies/Electives 9
  Credits 15

Spring
- LANG 480 Capstone: Global Connections (if not taken in fall of Senior year) 3
- German Studies/Essential Studies/General Electives 12
  Credits 15

Total Credits 120

This is only an example. It is highly recommended that any student interested in a German Studies major or minor see a faculty member for an individualized plan. This is particularly important if you are an education major and or start the major after the Freshman year.

You must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)

B.A. with Major in Language: Norwegian

Freshman Year

Fall
- NORW 101 First Year Norwegian I 4
- Essential Studies/Electives 11
  Credits 15

Spring
- NORW 102 First Year Norwegian II 4
- Essential Studies/Electives 11
  Credits 15

Sophomore Year

Fall
- NORW 201 Second Year Norwegian I 4
- Essential Studies/Electives 11
  Credits 15

Spring
- NORW 202 Second Year Norwegian II 4
- Essential Studies/Electives 11
  Credits 15

Students are strongly encouraged to study abroad for a summer, semester, or year during their studies. Please see your adviser about planning for this worthwhile educational experience.

Junior Year

Fall
- NORW 350 Norwegian Culture 3
- NORW 432 Advanced Norwegian 3
- LANG 380 Global Gateways (can be taken in spring) 3
- Essential Studies/Electives 6
  Credits 15

Spring
- NORW 403 Great Literary Works of Norway 3
- NORW 431 Advanced Norwegian 3

Total Credits 120

This is only an example. It is highly recommended that any student interested in a Norwegian Studies major or minor see a faculty member for an individualized plan. This is also true for those students who start the major after their Freshman year.

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Spanish

**B.A. with Major in Language: Spanish**

**Freshman Year**

**Fall**
- SPAN 101: First Year Spanish I  
  Essential Studies/Electives  
  Credits  
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**Spring**
- SPAN 102: First Year Spanish II  
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**Sophomore Year**

**Fall**
- SPAN 201: Second Year Spanish I  
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  Credits  
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**Spring**
- SPAN 202: Second Year Spanish II  
  Essential Studies/Electives  
  Credits  
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**Junior Year**

**Fall**
- SPAN 308  or SPAN 309: Spanish Conversation or Spanish Composition  
  LANG 380: Global Gateways  
  Essential Studies/Electives  
  Credits  
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**Spring**
- SPAN 308  or SPAN 309: Spanish Conversation or Spanish Composition  
  SPAN 304  or SPAN 450: Spanish Phonetics or Advanced Spanish Grammar  
  Essential Studies/Electives  
  Credits  
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**Senior Year**

**Fall**
- SPAN 420  or SPAN 421  or SPAN 422  or SPAN 423: Early Spanish Literature & Culture or Modern & Contemporary Spanish Literature & Culture or Early Latin American Literature & Culture or Modern & Contemporary Latin American Literature & Culture  
  Essential Studies/Electives  
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**Spring**
- SPAN 420  or SPAN 421  or SPAN 422  or SPAN 423: Early Spanish Literature & Culture or Modern & Contemporary Spanish Literature & Culture or Early Latin American Literature & Culture or Modern & Contemporary Latin American Literature & Culture  
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  Credits  
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**Mathematics**

**B.S. with Major in Mathematics**

**B.S. with Major in Mathematics with Secondary Education Certification**

**Freshman Year**

**Fall**
- CSCI 160: Computer Science I  
  CSCI 160L: Computer Prog I Lab  
  ENGL 110: College Composition I  
  MATH 165: Calculus I  
  ES: Social Science  
  ES: Fine Arts  
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**Spring**
- MATH 207: Introduction to Linear Algebra  
  ENGL 130: Composition II: Writing for Public Audiences  
  MATH 166: Calculus II  
  ES: Lab Science  
  ES: Humanities  
  Credits  
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## Sophomore Year
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<td>ES: Fine Arts/Humanities</td>
<td>3</td>
</tr>
<tr>
<td>General Electives</td>
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</tr>
<tr>
<td><strong>Credits</strong></td>
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### Spring
<table>
<thead>
<tr>
<th>Course</th>
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</tr>
</thead>
<tbody>
<tr>
<td>MATH 266 Elementary Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>ES: Communication/Oral</td>
<td>3</td>
</tr>
<tr>
<td>ES: Social Science</td>
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<tr>
<td>General Electives</td>
<td>6-9</td>
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## Junior Year
### Fall
<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>MATH 421 Statistical Theory I</td>
<td>3</td>
</tr>
<tr>
<td>General Electives</td>
<td>12-15</td>
</tr>
<tr>
<td><strong>Credits</strong></td>
<td><strong>15-18</strong></td>
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### Spring
<table>
<thead>
<tr>
<th>Course</th>
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</thead>
<tbody>
<tr>
<td>MATH 352 Introduction to Partial Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>MATH 422 Statistical Theory II</td>
<td>3</td>
</tr>
<tr>
<td>General Electives</td>
<td>9-12</td>
</tr>
<tr>
<td><strong>Credits</strong></td>
<td><strong>15-18</strong></td>
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## Senior Year
### Fall
<table>
<thead>
<tr>
<th>Course</th>
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</thead>
<tbody>
<tr>
<td>MATH 488 Senior Capstone</td>
<td>3</td>
</tr>
<tr>
<td>Math Elective</td>
<td>3</td>
</tr>
<tr>
<td>General Electives</td>
<td>9-12</td>
</tr>
<tr>
<td><strong>Credits</strong></td>
<td><strong>15-18</strong></td>
</tr>
</tbody>
</table>

### Spring
<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math Elective</td>
<td>3</td>
</tr>
<tr>
<td>General Electives</td>
<td>9-12</td>
</tr>
<tr>
<td><strong>Credits</strong></td>
<td><strong>12-15</strong></td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>121-136</strong></td>
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</tbody>
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This is only a representative plan. This plan assumes that the student will use MATH 421-MATH 422 to satisfy the departmental depth requirement, MATH 330 to satisfy the breadth requirement in Theoretical Mathematics, and MATH 352 to satisfy the Applications of Mathematics requirement. MATH 421 satisfies the Probability and Statistics requirement. Two additional three credit math electives would be required. Please consult your academic adviser to develop your individual 4-year plan.

Students must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. ([https://und.edu/academics/essential-studies](https://und.edu/academics/essential-studies))

---

## B.S. with Major in Mathematics with Secondary Education Certification

### Freshman Year
#### Fall
<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>CSCI 160 Computer Science I</td>
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<td>CSCI 160L Computer Prog I Lab</td>
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<tr>
<td>ENGL 110 College Composition I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 165 Calculus I</td>
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</tr>
<tr>
<td>ES: Social Science</td>
<td>3</td>
</tr>
<tr>
<td><strong>Credits</strong></td>
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### Senior Year
#### Fall
<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MATH 400 Methods for Teaching Middle and Secondary Mathematics; Pedagogical Content Knowledge</td>
<td>3</td>
</tr>
<tr>
<td>MATH 441 Abstract Algebra</td>
<td>3</td>
</tr>
<tr>
<td>MATH 488 Senior Capstone</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 486 Field Experience</td>
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<tr>
<td><strong>Credits</strong></td>
<td><strong>16-19</strong></td>
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</table>

This is only a representative plan, however there are only a limited number of options. Consult your academic adviser regularly. 120 credits are needed to graduate.

Students must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement.
Music

B.A. with Major in Music - Concentration Option

B.A. with Major in Music - Concentration Option - Composition Emphasis (Even Fall Entry)

B.A. with Major in Music - Concentration Option - Composition Emphasis (Odd Fall Entry)

B.A. with Major in Music - Foreign Language Option

B.A. with Major in Music - Foreign Language Option - Composition Emphasis (Even Fall Entry)

B.A. with Major in Music - Foreign Language Option - Composition Emphasis (Odd Fall Entry)

**B.A. with Major in Music - Concentration Option**

**Freshman Year**

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUSC 130</td>
<td>Music Theory I 3</td>
</tr>
<tr>
<td>MUSC 131</td>
<td>Aural Skills I 1</td>
</tr>
<tr>
<td>MUSC 133</td>
<td>Keyboard Skills I or MUSC 154 1</td>
</tr>
<tr>
<td>MUSC 154</td>
<td>Individual Lessons 1</td>
</tr>
<tr>
<td>Major Ensemble</td>
<td>Consult Advisor 1</td>
</tr>
<tr>
<td>ENGL 110</td>
<td>College Composition I 3</td>
</tr>
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</table>

**Essential Studies Math/Science/Technology (Q) 3**

**Electives 3**

**Credits 15**

**Spring**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUSC 134</td>
<td>Music Theory II 3</td>
</tr>
<tr>
<td>MUSC 135</td>
<td>Aural Skills II 1</td>
</tr>
<tr>
<td>MUSC 136</td>
<td>Keyboard Skills II or MUSC 154 1</td>
</tr>
<tr>
<td>MUSC 154</td>
<td>Individual Lessons 1</td>
</tr>
<tr>
<td>Major Ensemble</td>
<td>Consult Advisor 1</td>
</tr>
<tr>
<td>ENL 130</td>
<td>Composition II: Writing for Public Audiences 3</td>
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</table>

**Essential Studies Math/Science/Technology 3**

**Electives 3**

**Credits 16**

**Sophomore Year**

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>MUSC 230</td>
<td>Music Theory III 3</td>
</tr>
<tr>
<td>MUSC 231</td>
<td>Aural Skills III 1</td>
</tr>
<tr>
<td>MUSC 254</td>
<td>Individual Lessons 1</td>
</tr>
<tr>
<td>COMM 110</td>
<td>Fundamentals of Public Speaking 3</td>
</tr>
<tr>
<td>Essential Studies Fine Arts/Humanities (Non-Music) 3</td>
<td></td>
</tr>
<tr>
<td>Electives</td>
<td>3</td>
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**Credits 15**

**Spring**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>MUSC 234</td>
<td>Music Theory IV: Music Theory since 1900 3</td>
</tr>
<tr>
<td>MUSC 235</td>
<td>Aural Skills IV 1</td>
</tr>
<tr>
<td>MUSC 254</td>
<td>Individual Lessons 1</td>
</tr>
<tr>
<td>Major Ensemble</td>
<td>1</td>
</tr>
<tr>
<td>Essential Studies Social Science</td>
<td>3</td>
</tr>
</tbody>
</table>

**B.A. with Major in Music - Composition Emphasis (Even Fall Entry)**

**Freshman Year**

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ENGL 110</td>
<td>College Composition I 3</td>
</tr>
<tr>
<td>Electives</td>
<td>2</td>
</tr>
<tr>
<td>MUSC 154</td>
<td>Individual Lessons 1</td>
</tr>
<tr>
<td>MUSC 130</td>
<td>Music Theory I 3</td>
</tr>
<tr>
<td>MUSC 133</td>
<td>Keyboard Skills I or MUSC 154 1</td>
</tr>
<tr>
<td>Major Ensemble</td>
<td>Consult Advisor 1</td>
</tr>
<tr>
<td>Essential Studies Math/Science/Technology (Q) 3</td>
<td></td>
</tr>
</tbody>
</table>

**Credits 15**

**Spring**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUSC 136</td>
<td>Keyboard Skills II or Individual Lessons 1</td>
</tr>
<tr>
<td>MUSC 154</td>
<td>Individual Lessons 1</td>
</tr>
</tbody>
</table>

**B.A. with Major in Music - Composition Emphasis (Odd Fall Entry)**

**Freshman Year**

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 110</td>
<td>College Composition I 3</td>
</tr>
<tr>
<td>Electives</td>
<td>2</td>
</tr>
<tr>
<td>MUSC 154</td>
<td>Individual Lessons 1</td>
</tr>
<tr>
<td>MUSC 130</td>
<td>Music Theory I 3</td>
</tr>
<tr>
<td>MUSC 133</td>
<td>Keyboard Skills I or MUSC 154 1</td>
</tr>
<tr>
<td>Major Ensemble</td>
<td>Consult Advisor 1</td>
</tr>
<tr>
<td>Essential Studies Math/Science/Technology (Q) 3</td>
<td></td>
</tr>
</tbody>
</table>

**Credits 15**

**Spring**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUSC 136</td>
<td>Keyboard Skills II or Individual Lessons 1</td>
</tr>
<tr>
<td>MUSC 154</td>
<td>Individual Lessons 1</td>
</tr>
</tbody>
</table>

KS = Keyboard Skills or Piano Lessons. 1 = on Primary Instrument.

Students must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)
ENGL 130  Composition II: Writing for Public Audiences  3
MUSC 134  Music Theory II  3
Major Ensemble  1
Essential Studies Math/Science/Technology  3
MUSC 135  Aural Skills II  1

Credits  16

Sophomore Year
Fall
Essential Studies Humanities (Non-Music)  3
COMM 110  Fundamentals of Public Speaking  3
Electives  3
Major Ensemble  1
MUSC 254  Individual Lessons  1
MUSC 231  Aural Skills III  1
MUSC 230  Music Theory III  3

Credits  15

Spring
MUSC 235  Aural Skills IV  1
Essential Studies Social Science  3
Major Ensemble  1
Essential Studies Lab Science  4
Electives  3
MUSC 234  Music Theory IV: Music Theory since 1900  3
MUSC 254  Individual Lessons  1

Credits  16

Junior Year
Fall
Essential Studies Social Science (U)  3
MUSC 427  Analysis of Musical Form  2
Concentration  4
Music Electives  2
MUSC 310  Music History Survey I  3
MUSC 429  Composition  2

Credits  16

Spring
Electives  3
Concentration  4
MUSC 428  Counterpoint  2
MUSC 311  Music History Survey II  3
Music Electives  2
MUSC 430  Composition Lessons  1

Credits  15

Senior Year
Fall
Concentration  6
MUSC 423  Instrumental and Choral Arranging  2
MUSC 430  Composition Lessons  1
Essential Studies Social Science  3
Music Electives  3

Credits  15

Spring
Concentration  6
MUSC 203  Music and Culture  3
MUSC 490  Seminar in Music  3
MUSC 492  Senior Project  2
MUSC 340  Introduction to Music Technology  2
MUSC 430  Composition Lessons  1

Credits  17

Total Credits  125

1 = On Primary Instrument. KS = Keyboard Skills or Piano Lessons.

Students must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)

B.A. with Major in Music - Concentration Option - Composition Emphasis (Odd Fall Entry)

Freshman Year
Fall
ENGL 110  College Composition I  3
MUSC 130  Music Theory I  1
MUSC 154  Individual Lessons  1
Electives  2
MUSC 133  Keyboard Skills I  1
or MUSC 154  Individual Lessons
Essential Studies Math/Science/Technology  3
MUSC 131  Aural Skills I  1

Credits  15

Spring
ENGL 130  Composition II: Writing for Public Audiences  3
MUSC 135  Aural Skills II  1
MUSC 154  Individual Lessons  1
Electives  3
MUSC 134  Music Theory II  3
MUSC 136  Keyboard Skills II  1
or MUSC 154  Individual Lessons
Essential Studies Math/Science/Technology  3
Major Ensemble  1

Credits  16

Sophomore Year
Fall
Electives  3
Essential Studies Humanities (Non-Music)  3
Major Ensemble  1
MUSC 231  Aural Skills III  1
MUSC 254  Individual Lessons  1
MUSC 230  Music Theory III  3
COMM 110  Fundamentals of Public Speaking  3

Credits  15

Spring
Essential Studies Lab Science  4
Major Ensemble  1
MUSC 234  Music Theory IV: Music Theory since 1900  3
MUSC 235  Aural Skills IV  1
MUSC 254  Individual Lessons  1
MUSC 230  Music Theory III  3

Credits  15

Junior Year
Fall
Concentration  4
Music Electives  2
MUSC 310  Music History Survey I  3
MUSC 429  Composition  2
MUSC 423  Instrumental and Choral Arranging  2
Essential Studies Social Science (U)  3

Credits  16
### Spring

<table>
<thead>
<tr>
<th>Concentration</th>
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<tbody>
<tr>
<td>Music Electives</td>
<td>2</td>
</tr>
<tr>
<td>MUSC 340</td>
<td>Introduction to Music Technology</td>
</tr>
<tr>
<td>MUSC 311</td>
<td>Music History Survey II</td>
</tr>
<tr>
<td>Electives</td>
<td>4</td>
</tr>
<tr>
<td>MUSC 430</td>
<td>Composition Lessons</td>
</tr>
</tbody>
</table>

**Credits** 16

### Senior Year

#### Fall

- Essential Studies Social Science: 3
- Concentration: 6
- MUSC 427: Analysis of Musical Form: 2
- MUSC 430: Composition Lessons: 1
- Music Electives: 3

**Credits** 15

#### Spring

- MUSC 430: Composition Lessons: 1
- MUSC 203: Music and Culture: 3
- MUSC 490: Seminar in Music: 3
- MUSC 492: Senior Project: 2
- MUSC 428: Counterpoint: 2
- Concentration: 2

**Credits** 17

**Total Credits** 125

1 = On Primary Instrument. KS = Keyboard Skills or Piano Lessons.

Students must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. ([https://und.edu/academics/essential-studies](https://und.edu/academics/essential-studies))

### B.A. with Major in Music - Foreign Language Option

#### Freshman Year

##### Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MUSC 130</td>
<td>3</td>
</tr>
<tr>
<td>MUSC 131</td>
<td>1</td>
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<tr>
<td>MUSC 133</td>
<td>1</td>
</tr>
<tr>
<td>or MUSC 154</td>
<td></td>
</tr>
<tr>
<td>Keyboard Skills I</td>
<td></td>
</tr>
<tr>
<td>or Individual Lessons</td>
<td></td>
</tr>
<tr>
<td>Major Ensemble Consult</td>
<td>1</td>
</tr>
<tr>
<td>Advisor</td>
<td></td>
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<td>ENGL 110</td>
<td>3</td>
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<tr>
<td>Essential Studies Math/</td>
<td>3</td>
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<tr>
<td>Science/Technology</td>
<td></td>
</tr>
<tr>
<td>Electives</td>
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**Credits** 16

##### Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>MUSC 134</td>
<td>3</td>
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<td>MUSC 135</td>
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<tr>
<td>MUSC 136</td>
<td>1</td>
</tr>
<tr>
<td>or MUSC 154</td>
<td></td>
</tr>
<tr>
<td>Keyboard Skills II</td>
<td></td>
</tr>
<tr>
<td>or Individual Lessons</td>
<td></td>
</tr>
<tr>
<td>MUSC 154</td>
<td>1</td>
</tr>
<tr>
<td>Essential Studies Math/</td>
<td>3</td>
</tr>
<tr>
<td>Science/Technology</td>
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</tr>
<tr>
<td>Major Ensemble</td>
<td>1</td>
</tr>
<tr>
<td>ENGL 130</td>
<td>3</td>
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**Credits** 16

### Sophomore Year

#### Fall

<table>
<thead>
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</thead>
<tbody>
<tr>
<td>MUSC 230</td>
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<tr>
<td>MUSC 231</td>
<td>1</td>
</tr>
<tr>
<td>MUSC 254</td>
<td>1</td>
</tr>
<tr>
<td>Major Ensemble</td>
<td>1</td>
</tr>
<tr>
<td>COMM 110</td>
<td>3</td>
</tr>
<tr>
<td>Essential Studies Humanities (Non-Music)</td>
<td>3</td>
</tr>
<tr>
<td>Electives</td>
<td>3</td>
</tr>
</tbody>
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**Credits** 15

#### Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUSC 234</td>
<td>3</td>
</tr>
<tr>
<td>MUSC 235</td>
<td>1</td>
</tr>
<tr>
<td>MUSC 254</td>
<td>1</td>
</tr>
<tr>
<td>Major Ensemble</td>
<td>1</td>
</tr>
<tr>
<td>Essential Studies Social Science</td>
<td>3</td>
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<tr>
<td>Essential Studies Lab Science</td>
<td>4</td>
</tr>
<tr>
<td>Electives</td>
<td>3</td>
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**Credits** 16

### Junior Year

#### Fall

<table>
<thead>
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<th>Course</th>
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<tbody>
<tr>
<td>MUSC 310</td>
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<tr>
<td>Music Electives</td>
<td>2</td>
</tr>
<tr>
<td>Foreign Language I</td>
<td>4</td>
</tr>
<tr>
<td>Essential Studies Social Science</td>
<td>3</td>
</tr>
<tr>
<td>Electives</td>
<td>4</td>
</tr>
</tbody>
</table>

**Credits** 16

#### Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUSC 311</td>
<td>3</td>
</tr>
<tr>
<td>Music Electives</td>
<td>2</td>
</tr>
<tr>
<td>Foreign Language II</td>
<td>4</td>
</tr>
<tr>
<td>Electives</td>
<td>6</td>
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</tbody>
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**Credits** 15

### Senior Year

#### Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Music Electives</td>
<td>3</td>
</tr>
<tr>
<td>Foreign Language III</td>
<td>4</td>
</tr>
<tr>
<td>Essential Studies Social Science</td>
<td>3</td>
</tr>
<tr>
<td>Electives</td>
<td>6</td>
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**Credits** 16

#### Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUSC 203</td>
<td>3</td>
</tr>
<tr>
<td>MUSC 490</td>
<td>3</td>
</tr>
<tr>
<td>MUSC 492</td>
<td>2</td>
</tr>
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<td>Foreign Language IV</td>
<td>4</td>
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<td>Electives</td>
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</tbody>
</table>

**Credits** 15

**Total Credits** 125

1 = On Primary Instrument. KS = Keyboard Skills or Piano Lessons.

Students must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. ([https://und.edu/academics/essential-studies](https://und.edu/academics/essential-studies))
### B.A. with Major in Music - Foreign Language Option - Composition Emphasis (Even Fall Entry)

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<tr>
<td>MUSC 154</td>
<td>Individual Lessons 1</td>
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<tr>
<td>MUSC 131</td>
<td>Aural Skills I</td>
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<tr>
<td>MUSC 130</td>
<td>Music Theory I</td>
<td>3</td>
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<tr>
<td>Essential Studies Math/Science/Technology (Q)</td>
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<td>Major Ensemble</td>
<td>Consult Advisor</td>
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<tr>
<td>MUSC 133 or MUSC 154</td>
<td>Keyboard Skills I KS or Individual Lessons</td>
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<td></td>
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<td>ENGL 130</td>
<td>Composition II: Writing for Public Audiences</td>
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<tr>
<td>MUSC 135</td>
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<td>MUSC 134</td>
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**Senior Year**

| Fall | Electives | 3 |
| Essential Studies Social Science | 3 |
| MUSC 423 | Instrumental and Choral Arranging | 2 |
| MUSC 430 | Composition Lessons | 1 |
|                | Credits | 16 |
| Spring         | Electives | 3 |
| MUSC 203      | Music and Culture | 3 |
| MUSC 490      | Seminar in Music | 3 |
| MUSC 492      | Senior Project | 2 |
| MUSC 340      | Introduction to Music Technology | 2 |
| MUSC 430      | Composition Lessons | 1 |
|                | Credits | 15 |

**Total Credits** 125

KS = Keyboard Skills or Piano Lessons. 1 = on Primary Instrument.

Students must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. ([https://und.edu/academics/essential-studies](https://und.edu/academics/essential-studies))

### B.A. with Major in Music - Foreign Language Option - Composition Emphasis (Odd Fall Entry)

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<tr>
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<tr>
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<td>Junior Year</td>
<td>Fall</td>
<td>Electives</td>
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<td>MUSC 136 or MUSC 154</td>
<td>Keyboard Skills II or Individual Lessons</td>
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<td>MUSC 154</td>
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<tr>
<td>Essential Studies Math/Science/Technology</td>
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<td>Fundamentals of Public Speaking</td>
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<tr>
<td>Essential Studies Humanities (Non-Music)</td>
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### Music Education

#### B.M. with Major in Music Education - Choral Track (Even Fall Entry)

#### B.M. with Major in Music Education - Choral Track (Odd Fall Entry)

#### B.M. with Major in Music Education - Instrumental Track (Even Fall Entry)

#### B.M. with Major in Music Education - Instrumental Track (Odd Fall Entry)

**Freshman Year**

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<td>MUSC 131</td>
<td>Aural Skills I</td>
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<tr>
<td>MUSC 133</td>
<td>Keyboard Skills I</td>
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<tr>
<td>or MUSC 154</td>
<td>Individual Lessons</td>
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<tr>
<td>MUSC 152</td>
<td>Class Guitar for Music Majors</td>
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<tr>
<td>MUSC 154</td>
<td>Individual Lessons</td>
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<td>Major Ensemble</td>
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<tr>
<td>ENGL 110</td>
<td>College Composition I</td>
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<tr>
<td>Essential Studies Lab Science</td>
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**Credits**

- 15

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<tr>
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<td>Music Theory II</td>
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<td>MUSC 135</td>
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<td>Individual Lessons</td>
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<td>MUSC 154</td>
<td>Individual Lessons</td>
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<tr>
<td>Major Ensemble</td>
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<tr>
<td>Essential Studies Math/Science/Technology</td>
<td></td>
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<tr>
<td>ENGL 130</td>
<td>Composition II: Writing for Public Audiences</td>
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<tr>
<td>T&amp;L 319</td>
<td>Integrating Diverse Needs in Educational Settings</td>
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**Credits**

- 16

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<td>MUSC 140</td>
<td>Methods: Woodwinds, Brass, Strings, Percussion, Voice</td>
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<td>MUSC 231</td>
<td>Aural Skills III</td>
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<td>MUSC 233</td>
<td>Keyboard Skills III</td>
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<td>or MUSC 254</td>
<td>Individual Lessons</td>
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<td>MUSC 254</td>
<td>Individual Lessons</td>
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<td>MUSC 256</td>
<td>Basic Conducting</td>
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<td>Major Ensemble</td>
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<tr>
<td>T&amp;L 250</td>
<td>Introduction to Education</td>
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<tr>
<td>COMM 110</td>
<td>Fundamentals of Public Speaking</td>
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**Credits**

- 16

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<th>Junior Year</th>
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<tr>
<td>MUSC 203</td>
<td>Music and Culture</td>
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<td>Music Theory IV: Music Theory since 1900</td>
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<td>Aural Skills IV</td>
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<td>Keyboard Skills IV</td>
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<td>or MUSC 254</td>
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<tr>
<td>MUSC 242</td>
<td>Diction for Singers (Italian/German)</td>
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**Credits**

- 16

**Electives**

- 3

### Notes

1 = On Primary Instrument. KS = Keyboard Skills or Piano Lessons.

Students must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)
MUSC 427  Analysis of Musical Form  2  
MUSC 444  Applied Music Pedagogy  2  
T&L 433  Multicultural Education  3  
Essential Studies Math, Science, Technology  3  

Credits  16  

Spring  
Major Ensemble  1  
MUSC 311  Music History Survey II  3  
MUSC 340  Introduction to Music Technology  2  
MUSC 354  Individual Lessons  1  
MUSC 357  Choral Conducting  2  
MUSC 441  Methods and Materials for Middle and Secondary  4  
& T&L 486  School Music and Field Experience  1  
Essential Studies Fine Arts/Humanities (Non-MUSC)  3  

Credits  16  

Senior Year  
Fall  
Major Ensemble  1  
MUSC 416  Choral Literature  2  
MUSC 440  Methods and Materials for Elementary Music  4  
& T&L 386  and Field Experience  1  
MUSC 423  Instrumental and Choral Arranging  2  
MUSC 445  Choral Methods  3  
MUSC 454  Individual Lessons  1  
MUSC 459  Senior Recital  1-2  
T&L 252  Child Development  3  

Credits  17-18  

Spring  
T&L 487  Student Teaching  16  
T&L 488  Senior Seminar  1  

Total Credits  129-130  

KS = Keyboard Skills or Piano Lessons  -  See Advisor.  1 = Voice.  

Students must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)  

B.M. with Major in Music Education - Choral Track (Odd Fall Entry)  

Freshman Year  
Fall  
MUSC 130  Music Theory I  3  
MUSC 131  Aural Skills I  1  
MUSC 133  Keyboard Skills I  1  
MUSC 152  Class Guitar for Music Majors  1  
MUSC 154  Individual Lessons  1  
Major Ensemble - Consult Advisor  1  
ENGL 110  College Composition I  3  
Essential Studies Lab Science  4  

Credits  15  

Spring  
MUSC 134  Music Theory II  3  
MUSC 135  Aural Skills II  1  
MUSC 136  Keyboard Skills II  1  
MUSC 154  Individual Lessons  1  
MUSC 254  Individual Lessons  1  
Major Ensemble  1  
T&L 250  Introduction to Education  3  
COMM 110  Fundamentals of Public Speaking  3  

Credits  16  

Sophomore Year  
Fall  
MUSC 140  Methods: Woodwinds, Brass, Strings, Percussion, Voice  1  
MUSC 203  Music and Culture  3  
MUSC 234  Music Theory IV: Music Theory since 1900  3  
MUSC 235  Aural Skills IV  1  
MUSC 236  Keyboard Skills IV  1  
MUSC 254  Individual Lessons  1  
Major Ensemble  1  
MUSC 357  Choral Conducting  2  
Essential Studies Social Science  3  

Credits  16  

Junior Year  
Fall  
MUSC 242  Diction for Singers  1  
MUSC 310  Music History Survey I  3  
MUSC 354  Individual Lessons  1  
MUSC 416  Choral Literature  2  
MUSC 423  Instrumental and Choral Arranging  2  
T&L 433  Multicultural Education  3  
Essential Studies Math/Science/Technology  3  

Credits  16  

Spring  
MUSC 311  Music History Survey II  3  
MUSC 340  Introduction to Music Technology  2  
MUSC 354  Individual Lessons  1  
MUSC 358  Instrumental Conducting  2  
MUSC 441  Methods and Materials for Middle and Secondary  4  
& T&L 486  School Music and Field Experience  1  
Essential Studies Math/Science/Technology  3  

Credits  16  

Senior Year  
Fall  
MUSC 427  Analysis of Musical Form  2  
MUSC 440  Methods and Materials for Elementary Music  4  
& T&L 386  and Field Experience  1  
MUSC 444  Applied Music Pedagogy  2  
MUSC 445  Choral Methods  3  
MUSC 454  Individual Lessons  1  

Credits  16  

University of North Dakota  253
B.M. with Major in Music Education - Instrumental Track (Even Fall Entry)

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<td>MUSC 133</td>
<td>Keyboard Skills I KS or MUSC 154</td>
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<td>MUSC 140</td>
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<td>MUSC 203</td>
<td>Music and Culture</td>
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<td>MUSC 234</td>
<td>Music Theory IV: Music Theory since 1900</td>
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<td>MUSC 235</td>
<td>Aural Skills IV</td>
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<td>MUSC 236</td>
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<td>MUSC 258</td>
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<td>Essential Studies Social Science</td>
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Junior Year

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<tr>
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<th>Credits</th>
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<tr>
<td>Fall</td>
<td>MUSC 140</td>
<td>Methods: Woodwinds, Brass, Strings, Percussion, Voice</td>
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<td>Major Ensemble</td>
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<td></td>
<td>MUSC 310</td>
<td>Music History Survey I</td>
<td>3</td>
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<td>MUSC 354</td>
<td>Individual Lessons</td>
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<td></td>
<td>MUSC 417</td>
<td>Instrumental Literature</td>
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<td>MUSC 427</td>
<td>Analysis of Musical Form</td>
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<td>T&amp;L 433</td>
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<td>Credits</td>
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<td>Spring</td>
<td>MUSC 140</td>
<td>Methods: Woodwinds, Brass, Strings, Percussion, Voice</td>
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<td>Major Ensemble</td>
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<td>MUSC 423</td>
<td>Instrumental and Choral Arranging</td>
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<td>MUSC 440</td>
<td>Methods and Materials for Elementary Music</td>
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<td>&amp; T&amp;L 486</td>
<td>School Music and Field Experience</td>
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<td>T&amp;L 252</td>
<td>Child Development</td>
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Senior Year

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<td>Fall</td>
<td>MUSC 140</td>
<td>Methods: Woodwinds, Brass, Strings, Percussion, Voice</td>
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<td>Major Ensemble</td>
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<td>MUSC 437</td>
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<td>MUSC 454</td>
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<td>MUSC 499</td>
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<td>Essential Studies</td>
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<td>T&amp;L 487</td>
<td>Student Teaching</td>
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</table>

KS = Keyboard Skills or Piano Lessons. 1 = On Voice.

Students must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)
B.M. with Major in Music Education - Instrumental Track (Odd Fall Entry)

Freshman Year

<table>
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<tr>
<th>Fall</th>
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<tbody>
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<td>MUSC 130</td>
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<tr>
<td>Music Theory I</td>
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<td>MUSC 131</td>
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<tr>
<td>Aural Skills I</td>
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<td>MUSC 133</td>
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<td>Keyboard Skills I</td>
<td></td>
</tr>
<tr>
<td>or MUSC 154</td>
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<tr>
<td>or Individual Lessons</td>
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<tr>
<td>MUSC 140</td>
<td>1</td>
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<tr>
<td>Methods: Woodwinds, Brass, Strings, Percussion, Voice (- Voice)</td>
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<tr>
<td>MUSC 154</td>
<td>1</td>
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<td>Individual Lessons</td>
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<tr>
<td>ENGL 110</td>
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<td>College Composition I</td>
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<td>Essential Studies Lab Science</td>
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</table>

Credits 15

Spring

| MUSC 134      | 3       |
| Music Theory II |         |
| MUSC 135      | 1       |
| Aural Skills II |        |
| MUSC 136      | 1       |
| Keyboard Skills II |       |
| or MUSC 154   |         |
| or Individual Lessons | |
| MUSC 154      | 1       |
| Individual Lessons | |
| Major Ensemble|         |
| ENGL 130      | 3       |
| Composition II: Writing for Public Audiences | |
| T&L 319       | 3       |
| Integrating Diverse Needs in Educational Settings | |
| Essential Studies Math/Science/Technology | 3 |

Credits 16

Sophomore Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MUSC 140</td>
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<tr>
<td>Methods: Woodwinds, Brass, Strings, Percussion, Voice</td>
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<tr>
<td>MUSC 230</td>
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<tr>
<td>Music Theory III</td>
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<td>Keyboard Skills III</td>
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<td>or MUSC 254</td>
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<td>or Individual Lessons</td>
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<td>MUSC 256</td>
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<td>Basic Conducting</td>
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<td>Major Ensemble</td>
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<tr>
<td>T&amp;L 250</td>
<td>3</td>
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<tr>
<td>Introduction to Education</td>
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<td>COMM 110</td>
<td>3</td>
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<tr>
<td>Fundamentals of Public Speaking</td>
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Credits 16

Spring

| MUSC 140      | 1       |
| Methods: Woodwinds, Brass, Strings, Percussion, Voice | |
| MUSC 203      | 3       |
| Music and Culture | |
| MUSC 234      | 3       |
| Music Theory IV: Music Theory since 1900 | |
| MUSC 235      | 1       |
| Aural Skills IV |       |
| MUSC 236      | 1       |
| Keyboard Skills IV |       |
| or MUSC 254   |         |
| or Individual Lessons | |
| MUSC 254      | 1       |
| Individual Lessons | |
| Major Ensemble|         |
| MUSC 357      | 2       |
| Choral Conducting | |
| Essential Studies Social Science | 3 |

Credits 16

Junior Year

<table>
<thead>
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<th>Fall</th>
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<tbody>
<tr>
<td>MUSC 140</td>
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<tr>
<td>Methods: Woodwinds, Brass, Strings, Percussion, Voice</td>
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</tr>
<tr>
<td>Major Ensemble</td>
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<tr>
<td>MUSC 310</td>
<td>3</td>
</tr>
<tr>
<td>Music History Survey I</td>
<td></td>
</tr>
<tr>
<td>MUSC 354</td>
<td>1</td>
</tr>
<tr>
<td>Individual Lessons</td>
<td></td>
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<tr>
<td>MUSC 423</td>
<td>2</td>
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<tr>
<td>Instrumental and Choral Arranging</td>
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<tr>
<td>MUSC 446</td>
<td>3</td>
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<tr>
<td>Instrumental Classroom Methods and Materials</td>
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Credits 16

T&L 433        | 3       |
| Multicultural Education | |
| Essential Studies Fine Arts/Humanities (non-MUSC) | 3 |

Spring

| MUSC 140      | 1       |
| Methods: Woodwinds, Brass, Strings, Percussion, Voice | |
| Major Ensemble|         |
| MUSC 311      | 3       |
| Music History Survey II | |
| MUSC 340      | 2       |
| Introduction to Music Technology | |
| MUSC 354      | 1       |
| Individual Lessons | |
| MUSC 358      | 2       |
| Instrumental Conducting | |
| MUSC 441      | 4       |
| Methods and Materials for Middle and Secondary & T&L 486 | School Music and Field Experience |
| T&L 252       | 3       |
| Child Development | |

Credits 17

Senior Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MUSC 140</td>
<td>1</td>
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<tr>
<td>Methods: Woodwinds, Brass, Strings, Percussion, Voice (Voice Methods)</td>
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<td>Major Ensemble</td>
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<tr>
<td>MUSC 417</td>
<td>2</td>
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<tr>
<td>Instrumental Literature</td>
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<td>MUSC 427</td>
<td>2</td>
</tr>
<tr>
<td>Analysis of Musical Form</td>
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<tr>
<td>MUSC 440</td>
<td>4</td>
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<tr>
<td>Methods and Materials for Elementary Music &amp; T&amp;L 386</td>
<td>and Field Experience</td>
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<tr>
<td>MUSC 454</td>
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<tr>
<td>Individual Lessons</td>
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<tr>
<td>MUSC 459</td>
<td>1-2</td>
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<td>Senior Recital</td>
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<td>T&amp;L 252</td>
<td>3</td>
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<td>Child Development</td>
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<td>T&amp;L 487</td>
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<td>Student Teaching</td>
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<td>T&amp;L 488</td>
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<td>Senior Seminar</td>
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Credits 17

Total Credits 129-130

KS = Keyboard Skills or Piano Lessons. 1 = On Primary Instrument.

Students must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)

Musical Theatre

B.F.A. in Musical Theatre with a Major in Theatre Arts

First Year

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Credits</th>
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<tbody>
<tr>
<td>THEA 110</td>
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<tr>
<td>Introduction to Theatre Arts</td>
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<tr>
<td>THEA 120</td>
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</tr>
<tr>
<td>Voice and Movement I</td>
<td></td>
</tr>
<tr>
<td>THEA 240</td>
<td>2</td>
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<tr>
<td>Ballet I</td>
<td></td>
</tr>
<tr>
<td>MUSC 130</td>
<td>3</td>
</tr>
<tr>
<td>Music Theory I</td>
<td></td>
</tr>
<tr>
<td>MUSC 131</td>
<td>1</td>
</tr>
<tr>
<td>Aural Skills I</td>
<td></td>
</tr>
<tr>
<td>MUSC 154</td>
<td>1</td>
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<td>Individual Lessons</td>
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<td>Essential Studies courses</td>
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</table>

Credits 15

Second Semester

| THEA 161       | 3       |
| Acting I       |         |
| THEA 220       | 2       |
| Voice and Movement II | |
| MUSC 155       | 2       |
| Individual Lessons | |
Essential Studies courses 8

Credits 15

Second Year
First Semester
THEA 204 Introduction to Acting for Musical Theatre 3
THEA 225 Makeup for the Stage 3
THEA 242 Tap Dance 1
THEA 270 Stagecraft 3
MUSC 133 Keyboard Skills I 1
MUSC 254 Individual Lessons 1
Essential Studies courses 3

Credits 15

Second Semester
THEA 201 Theatre Practicum 1
THEA 230 Text Analysis 3
MUSC 255 Individual Lessons 2
MUSC 260 Concert Choir 1
or MUSC 263 or Varsity Bards Men’s Chorus
MUSC 264 or Women’s Chorus
Essential Studies/THEA elective courses 8

Credits 15

Third Year
First Semester
THEA 271 Intermediate Acting I: The Actor in You 3
THEA 300 Play Direction I 3
THEA 344 Musical Theatre Dance Style 2
MUSC 355 Individual Lessons 4
Essential Studies/THEA elective courses 3

Credits 15

Second Semester
THEA 371 Advanced Acting: Advanced Scene Study 3
MUSC 355 Individual Lessons 4
Essential Studies/THEA elective courses 8

Credits 15

Fourth Year
First Semester
THEA 241 Jazz Dance I 2
THEA 423 History of the Theatre: Classical, Medieval and Renaissance 3
THEA 450 Musical Theatre History 3
MUSC 455 Individual Lessons 4
Essential Studies/THEA elective course 3

Credits 15

Second Semester
THEA 404 Acting for the Music Theatre 3
THEA 424 History of the Theatre: Seventeenth Century to the Present 3
THEA 494 Senior Project 4
MUSC 455 Individual Lessons 4
THEA/General Elective 1

Credits 15

Total Credits 120

This is an example only. Note that some courses are offered every other semester, so this plan may vary depending on the exact year the student enrolls. Students are required to meet with their adviser before registering for classes.

Students must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)

Philosophy and Religion

B.A. with Major in Philosophy and Religion: Philosophy Concentration

B.A. with Major in Philosophy and Religion: Pre-Law Concentration

B.A. with Major in Philosophy and Religion: Religion Concentration

B.A. with Major in Philosophy and Religion: Philosophy Concentration

Freshman Year
First Semester Credits
PHIL 110 Forward or Delete? An Introduction to Logic 3
ENGL 110 College Composition I 3
Electives/Essential Studies 9

Credits 15

Second Semester
PHIL 120 Introduction to Ethics 3
ENGL 130 Composition II: Writing for Public Audiences 3
Electives/Essential Studies 9

Credits 15

Sophomore Year
First Semester
PHIL 300 History of Philosophy I (Ancient/Modern) 3
Religious Studies Elective (200 level or higher) 3
Electives/Essential Studies 9

Credits 15

Second Semester
PHIL 301 History of Philosophy II (Medieval/19th Century) 3
Philosophy Elective (300 level or higher) 3
Electives/Essential Studies 9

Credits 15

Junior Year
First Semester
Philosophy Elective (300 level or higher) 3
Religious Studies Elective (200 level or higher) 3
Elective/Essential Studies 9

Credits 15

Second Semester
Philosophy Elective (300 level or higher) 3
Electives/Essential Studies 12

Credits 15

Senior Year
First Semester
Philosophy Elective (300 level or higher) 3
Electives/Essential Studies 12

Credits 15

Second Semester
PHIL 480 Public Philosophy 3
Philosophy Elective (300 level or higher) 3
Electives/Essential Studies 9

Credits 15

Total Credits 120

This plan represents only one way of completing a major in Philosophy and Religious Studies (Philosophy concentration). Students should work closely with faculty advisors to determine how best to meet their individual interests and goals. Students who identify Philosophy and Religious Studies as a major later in their undergraduate careers can complete this concentration. Students who major in Philosophy and Religious Studies are encouraged to explore a wide range of academic topics and fields of study as they select their electives.
B.A. with Major in Philosophy and Religion: Pre-Law Concentration

**Freshman Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
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<tbody>
<tr>
<td>PHIL 110 Forward or Delete? An Introduction to Logic</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 110 College Composition I</td>
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</tr>
<tr>
<td>Electives/Essential Studies</td>
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<tr>
<td><strong>Total Credits</strong></td>
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**Sophomore Year**

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<tbody>
<tr>
<td>PHIL 120 Introduction to Ethics</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 130 or PHIL 312 or American Philosophy</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 315 or Philosophy of Race &amp; Postcolonialism</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 331 or Contemporary European Philosophy</td>
<td>3</td>
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<tr>
<td>PHIL 342 or Advanced Ethics</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 355 or Social and Political Philosophy</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 360 or Feminist Philosophy</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 355 or Philosophy, Economics, and Politics</td>
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</tr>
<tr>
<td>or PHIL 451 or Current Topics in Political Philosophy</td>
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<tr>
<td>Electives/Essential Studies</td>
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**Junior Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
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<tbody>
<tr>
<td>PHIL 120 Introduction to Ethics</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 130 or PHIL 312 or American Philosophy</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 315 or Philosophy of Race &amp; Postcolonialism</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 331 or Contemporary European Philosophy</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 342 or Advanced Ethics</td>
<td>3</td>
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<tr>
<td>PHIL 355 or Social and Political Philosophy</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 360 or Feminist Philosophy</td>
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<tr>
<td>PHIL 355 or Philosophy, Economics, and Politics</td>
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</tr>
<tr>
<td>or PHIL 451 or Current Topics in Political Philosophy</td>
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<tr>
<td>Electives/Essential Studies</td>
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<tr>
<td><strong>Total Credits</strong></td>
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**Senior Year**

<table>
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<tr>
<th>Fall</th>
<th>Credits</th>
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<tbody>
<tr>
<td>PHIL 120 Introduction to Ethics</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 130 or PHIL 312 or American Philosophy</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 315 or Philosophy of Race &amp; Postcolonialism</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 331 or Contemporary European Philosophy</td>
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<tr>
<td>PHIL 342 or Advanced Ethics</td>
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</tr>
<tr>
<td>PHIL 355 or Social and Political Philosophy</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 360 or Feminist Philosophy</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 355 or Philosophy, Economics, and Politics</td>
<td>3</td>
</tr>
<tr>
<td>or PHIL 451 or Current Topics in Political Philosophy</td>
<td>3</td>
</tr>
<tr>
<td>Electives/Essential Studies</td>
<td>9</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

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B.A. with Major in Philosophy and Religion: Religion Concentration

**Freshman Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHIL 103 Introduction to Religious Studies (This course is offered in the fall and spring semesters each year.)</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 110 College Composition I</td>
<td>3</td>
</tr>
<tr>
<td>Electives/Essential Studies</td>
<td>9</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

**Spring**

| PHIL 120 Introduction to Ethics | 3 |
| PHIL 312 or American Philosophy | 3 |
| PHIL 315 or Philosophy of Race & Postcolonialism | 3 |
| PHIL 331 or Contemporary European Philosophy | 3 |
| PHIL 342 or Advanced Ethics | 3 |
| PHIL 355 or Social and Political Philosophy | 3 |
| PHIL 360 or Feminist Philosophy | 3 |
| PHIL 355 or Philosophy, Economics, and Politics | 3 |
| or PHIL 451 or Current Topics in Political Philosophy | 3 |
| Elective/Essential Studies | 9 |

**Total Credits** 15

**Senior Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHIL 120 Introduction to Ethics</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 130 or PHIL 312 or American Philosophy</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 315 or Philosophy of Race &amp; Postcolonialism</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 331 or Contemporary European Philosophy</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 342 or Advanced Ethics</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 355 or Social and Political Philosophy</td>
<td>3</td>
</tr>
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<tr>
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<td>3</td>
</tr>
<tr>
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</tr>
<tr>
<td><strong>Total Credits</strong></td>
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</tbody>
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<table>
<thead>
<tr>
<th>Elective/Essential Studies</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 130 Composition II: Writing for Public Audiences</td>
<td>9</td>
</tr>
<tr>
<td>PHIL 104 Religions of the West</td>
<td>3</td>
</tr>
<tr>
<td>or PHIL 201 or Introduction to the Bible</td>
<td>3</td>
</tr>
<tr>
<td>or PHIL 245 or Death and Dying</td>
<td>3</td>
</tr>
<tr>
<td>or PHIL 326 or Religious Violence</td>
<td>3</td>
</tr>
<tr>
<td>or PHIL 380 or Buddhism</td>
<td>3</td>
</tr>
</tbody>
</table>

**Sophomore Year**

**Fall**

Religious Studies Elective | 3 |

Elective/Essential Studies | 9 |

<table>
<thead>
<tr>
<th>Elective/Essential Studies</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHIL 105 Religions of Asia</td>
<td>3</td>
</tr>
<tr>
<td>or PHIL 217 or Religion in America</td>
<td>3</td>
</tr>
<tr>
<td>or PHIL 311 or Atheism and Secularism</td>
<td>3</td>
</tr>
<tr>
<td>or PHIL 320 or Hinduism</td>
<td>3</td>
</tr>
</tbody>
</table>

**Spring**

Electives/Essential Studies | 12 |

<table>
<thead>
<tr>
<th>Elective/Essential Studies</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHIL 104 Religions of the West</td>
<td>3</td>
</tr>
<tr>
<td>or PHIL 201 or Introduction to the Bible</td>
<td>3</td>
</tr>
<tr>
<td>or PHIL 245 or Death and Dying</td>
<td>3</td>
</tr>
<tr>
<td>or PHIL 316 or Daoism and Confucianism</td>
<td>3</td>
</tr>
<tr>
<td>or PHIL 339 or Christianity</td>
<td>3</td>
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</tbody>
</table>

**Junior Year**

**Fall**

Elective/Essential Studies | 12 |

<table>
<thead>
<tr>
<th>Elective/Essential Studies</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHIL 105 Religions of Asia</td>
<td>3</td>
</tr>
<tr>
<td>or PHIL 217 or Religion in America</td>
<td>3</td>
</tr>
<tr>
<td>or PHIL 227 or Mysticism and Spirituality in Religion</td>
<td>3</td>
</tr>
<tr>
<td>or PHIL 356 or Islam</td>
<td>3</td>
</tr>
</tbody>
</table>

**Spring**

Religious Studies Elective | 3 |

Elective/Essential Studies | 9 |

<table>
<thead>
<tr>
<th>Elective/Essential Studies</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHIL 104 Religions of the West</td>
<td>3</td>
</tr>
<tr>
<td>or PHIL 201 or Introduction to the Bible</td>
<td>3</td>
</tr>
<tr>
<td>or PHIL 245 or Death and Dying</td>
<td>3</td>
</tr>
<tr>
<td>or PHIL 326 or Religious Violence</td>
<td>3</td>
</tr>
<tr>
<td>or PHIL 380 or Buddhism</td>
<td>3</td>
</tr>
</tbody>
</table>

**Senior Year**

**Fall**

Elective/Essential Studies | 12 |

<table>
<thead>
<tr>
<th>Elective/Essential Studies</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHIL 104 Religions of the West</td>
<td>3</td>
</tr>
<tr>
<td>or PHIL 201 or Introduction to the Bible</td>
<td>3</td>
</tr>
<tr>
<td>or PHIL 245 or Death and Dying</td>
<td>3</td>
</tr>
<tr>
<td>or PHIL 380 or Buddhism</td>
<td>3</td>
</tr>
</tbody>
</table>

**Spring**

Religious Studies Elective | 3 |

Elective/Essential Studies | 9 |

<table>
<thead>
<tr>
<th>Elective/Essential Studies</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHIL 485 Seminar in Theory and Method (The capstone is not offered every semester, so students should pay attention to when it is offered. They may need to take it as early as the second semester of their junior year.)</td>
<td>3</td>
</tr>
</tbody>
</table>

**Credits** | **15**

**Total Credits** | **120**

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**Physics**

**B.S. with Major in Physics - four years, even year freshman enrollment**

**Freshman Year**

- **Fall**
  - PHYS 101 Survey of Physics & Astrophysics | 1
  - PHYS 110 Introductory Astronomy | 3
  - PHYS 110L Introductory Astronomy Lab | 1

- **Spring**
  - PHYS 101 University Physics I | 4
  - MATH 165 Calculus I | 4
  - Essential Studies | 2

**Sophomore Year**

- **Fall**
  - PHYS 251 University Physics II | 4
  - MATH 266 Elementary Differential Equations | 3
  - Essential Studies | 3

- **Spring**
  - PHYS 431 Quantum Mechanics I | 3
  - PHYS 325 Optics | 3

**Senior Year**

- **Fall**
  - PHYS 431 Quantum Mechanics I | 3
  - Essential Studies | 3

**Credits** | **15**

**Total Credits** | **120**
B.S. with Major in Physics - four years, odd year freshman enrollment

**Freshman Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 101</td>
<td>Survey of Physics &amp; Astrophysics</td>
</tr>
<tr>
<td>PHYS 110</td>
<td>Introductory Astronomy</td>
</tr>
<tr>
<td>PHYS 110L</td>
<td>Introductory Astronomy Lab</td>
</tr>
<tr>
<td>MATH 165</td>
<td>Calculus I</td>
</tr>
<tr>
<td>CHEM 121</td>
<td>General Chemistry I</td>
</tr>
<tr>
<td>CHEM 121L</td>
<td>General Chemistry I Laboratory</td>
</tr>
<tr>
<td>Essential Studies</td>
<td>2</td>
</tr>
<tr>
<td><strong>Credits</strong></td>
<td>15</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 251</td>
<td>University Physics I</td>
</tr>
<tr>
<td>MATH 166</td>
<td>Calculus II</td>
</tr>
<tr>
<td>CHEM 122</td>
<td>General Chemistry II</td>
</tr>
<tr>
<td>CHEM 122L</td>
<td>General Chemistry II Laboratory</td>
</tr>
<tr>
<td>Essential Studies</td>
<td>2</td>
</tr>
<tr>
<td><strong>Credits</strong></td>
<td>15</td>
</tr>
</tbody>
</table>

**Total Credits** 120

1 = Select an elective for a general physical degree or for one of four special tracks.

Students must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)

Psychology

**B.A. or B.S. with Major in Psychology**

**Freshman Year**

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 110</td>
<td>College Composition I (ES course)</td>
</tr>
<tr>
<td>MATH 103</td>
<td>College Algebra (ES course &amp; Major requirement)</td>
</tr>
<tr>
<td>FREN 101 or SPAN 101</td>
<td>First Year French I (ES course &amp; Major requirement)</td>
</tr>
<tr>
<td>or GERM 101 or NORW 101 or CHIN 101</td>
<td>First Year Spanish I or First Year German I or First Year Norwegian I or First Year Chinese I</td>
</tr>
<tr>
<td>PSYC 111</td>
<td>Introduction to Psychology (ES course &amp; Major requirement)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 253</td>
<td>University Physics III</td>
</tr>
</tbody>
</table>

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Elective Course or Course in Minor

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Semester</td>
<td>PSYC 395</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>Junior Year</td>
<td>ENGL 130</td>
<td>Composition II: Writing for Public Audiences (ES Course &amp; Major requirement)</td>
<td>3</td>
</tr>
<tr>
<td>Junior Year</td>
<td>COMM 110</td>
<td>Fundamentals of Public Speaking (ES Course)</td>
<td>3</td>
</tr>
<tr>
<td>Junior Year</td>
<td>RHS 200</td>
<td>Helping Skills in Community Services</td>
<td>3</td>
</tr>
<tr>
<td>Senior Year</td>
<td>FREN 102</td>
<td>First Year French II (ES course &amp; Major requirement)</td>
<td>4</td>
</tr>
<tr>
<td>Senior Year</td>
<td>or SPAN 102</td>
<td>or First Year Spanish II</td>
<td>4</td>
</tr>
<tr>
<td>Senior Year</td>
<td>or GER M 102</td>
<td>or First Year German II</td>
<td>4</td>
</tr>
<tr>
<td>Senior Year</td>
<td>or CHIN 102</td>
<td>or First Year Norwegian II</td>
<td>4</td>
</tr>
<tr>
<td>Senior Year</td>
<td>or First Year Chinese II</td>
<td>4</td>
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Elective Courses or Courses in Minor

<table>
<thead>
<tr>
<th>Credits</th>
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<tbody>
<tr>
<td>16-18</td>
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</table>

Sophomore Year

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 111</td>
<td>Concepts of Biology (ES course &amp; Major requirement)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>or BIOL 150</td>
<td>or General Biology I</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>BIOL 111L</td>
<td>Concepts of Biology Laboratory (ES course &amp; Major requirement)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>or BIOL 150L</td>
<td>or General Biology I Laboratory</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>PSYC 241</td>
<td>Introduction to Statistics (ES Course &amp; Major requirement)</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>PSYC 303</td>
<td>Research Methods in Psychology (Major requirement)</td>
<td>4</td>
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</tr>
<tr>
<td>PSYC elective</td>
<td>3-4</td>
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<table>
<thead>
<tr>
<th>Credits</th>
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<tbody>
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Second Semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>PSYC 304</td>
<td>Advanced Research Methods (Major requirement) for BS only</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 330</td>
<td>Biological Bases of Behavior (online only)</td>
<td>4</td>
</tr>
<tr>
<td>or BIOL 151/151L</td>
<td>if taking BIOL 151 you must also take the lab</td>
<td>4</td>
</tr>
<tr>
<td>PSYC elective</td>
<td>3-6</td>
<td></td>
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<tr>
<td>Elective course or Course in Minor</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Social Science ES requirement</td>
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<table>
<thead>
<tr>
<th>Credits</th>
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<tbody>
<tr>
<td>16-19</td>
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Junior Year

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>PSYC 320</td>
<td>Professional Development &amp; Ethics (Major requirement)</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Fine Arts (ES requirement)</td>
<td>3</td>
<td></td>
<td></td>
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<tr>
<td>PSYC electives</td>
<td>6</td>
<td></td>
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<tr>
<td>Elective Courses or Courses in Minor</td>
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<td></td>
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<table>
<thead>
<tr>
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Second Semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>PSYC 395</td>
<td>Practical Experiences in Psychology (Major requirement)</td>
<td>2</td>
</tr>
<tr>
<td>or PSYC 475</td>
<td>or Psychological Helping Skills</td>
<td>2</td>
</tr>
<tr>
<td>or PSYC 493</td>
<td>or Instructional Experiences in Psychology</td>
<td>2</td>
</tr>
<tr>
<td>or PSYC 494</td>
<td>or Advanced Individual Research</td>
<td>2</td>
</tr>
<tr>
<td>PSYC electives</td>
<td>6-9</td>
<td></td>
</tr>
<tr>
<td>Elective Courses or Courses in Minor</td>
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<tr>
<th>Credits</th>
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<tbody>
<tr>
<td>14-17</td>
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</table>

Senior Year

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYC 405</td>
<td>History and Systems of Psychology (ES capstone &amp; Major requirement)</td>
<td>3</td>
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</tr>
<tr>
<td>PSYC 400-level course</td>
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<td></td>
<td></td>
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<tr>
<td>PSYC elective</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elective courses or courses in minor</td>
<td>6</td>
<td></td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
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</table>

Second Semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYC 433</td>
<td>Psychology of Learning (BS requirement)</td>
<td>4</td>
</tr>
<tr>
<td>or PSYC 436</td>
<td>or Perception</td>
<td>4</td>
</tr>
<tr>
<td>or PSYC 437</td>
<td>or Physiology of Behavior and Psychophysiological Measurement</td>
<td>4</td>
</tr>
<tr>
<td>or PSYC 439</td>
<td>or Cognitive Psychology</td>
<td>4</td>
</tr>
<tr>
<td>Elective Courses or Courses in Minor</td>
<td>6</td>
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</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>13-14</td>
</tr>
</tbody>
</table>

This plan of study represents just one way in which a student can complete the requirements for the Bachelor of Arts or Science with a major in Psychology within four years. Because of the large number of ways to complete the degree requirements for this major, students should consult their advisor for assistance regarding their specific plan of study.

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### Sociology

#### B. A. with Major in Sociology

**Freshman Year**

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOC 110</td>
<td>Introduction to Sociology</td>
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<td>ENGL 110</td>
<td>College Composition I</td>
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<td>Composition II: Writing for Public Audiences</td>
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<td>COMM 110</td>
<td>Fundamentals of Public Speaking</td>
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<td>SOC 250</td>
<td>Diversity in American Society</td>
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#### Sophomore Year

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<td>Basic Sociological Theory</td>
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<td>SOC 323</td>
<td>Sociological Research Methods</td>
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<td>SOC 326</td>
<td>Sociological Statistics</td>
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<td>SOC 352</td>
<td>Aging and Society</td>
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<td>Essential Studies: Fine Arts or Humanities</td>
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<td>Credits in selected minor</td>
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#### Junior Year

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<tr>
<td>SOC 306</td>
<td>Social Change and Social Movements</td>
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<tr>
<td>Essential Studies: Fine Arts or Humanities</td>
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<tr>
<td>Essential Studies: Social Science (Non Sociology)</td>
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</tbody>
</table>
Elective 3

Second Semester
SOC 431 Workplace Dynamics 1 3
SOC 361 Social Psychology 3
Credits in selected minor 3
Electives 8
Credits 15

Senior Year
First Semester
Credits in selected minor 3
Electives 9
Credits 12

Second Semester
SOC 436 Social Inequality 1 3
SOC 475 Sociology Capstone 3
Electives 9
Credits 15

Electives 8
Credits 17

Second Semester
SOC 431 Workplace Dynamics 1 3
SOC 361 Social Psychology 3
Credits in selected minor 3
Electives 8
Credits 15

Total Credits 120

1 = Or any 400 Sociology course except 475, 492, and 494. A concentration of a minimum of 20 hours in a single supplementary field other than sociology is required of all sociology majors. Students may consider using free electives to add an additional major.

Students must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)

Theatre Arts

B.A. in Theatre Arts with Major in Theatre Arts

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
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<tbody>
<tr>
<td>First Semester</td>
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</tr>
<tr>
<td>THEA 110 Introduction to Theatre Arts</td>
<td>3</td>
</tr>
<tr>
<td>THEA 161 Acting I</td>
<td>3</td>
</tr>
<tr>
<td>Essential Studies courses</td>
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<td>Credits</td>
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<td>Second Semester</td>
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<tr>
<td>THEA 201 Theatre Practicum</td>
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<tr>
<td>THEA 230 Text Analysis</td>
<td>3</td>
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<td>THEA 260 Costume Craft</td>
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<td>Essential Studies courses</td>
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Second Year

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Credits</th>
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<tbody>
<tr>
<td>THEA 225 Makeup for the Stage</td>
<td>3</td>
</tr>
<tr>
<td>THEA 270 Stagecraft</td>
<td>3</td>
</tr>
<tr>
<td>THEA 300 Play Direction I</td>
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<tr>
<td>or THEA 335 or Stage Management</td>
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<tr>
<td>Required course in chosen subplan</td>
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<tr>
<td>Essential Studies course</td>
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<tr>
<td>Credits</td>
<td>15</td>
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<tr>
<td>Second Semester</td>
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</tr>
<tr>
<td>THEA 330 Contemporary Theatre</td>
<td>3</td>
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<tr>
<td>Required courses in chosen subplan</td>
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<tr>
<td>Essential Studies courses</td>
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<td>Credits</td>
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</table>

Third Year

First Semester
Required courses in chosen subplan 5
Essential Studies/General Elective courses 10
Credits 15
Second Semester
Required courses in chosen subplan 5
Essential Studies/General Elective courses 10
Credits 15

Fourth Year

First Semester
THEA 423 History of the Theatre: Classical, Medieval and Renaissance 3
Required courses in chosen subplan 5
Essential Studies/General Elective courses 12
Credits 15
Second Semester
THEA 424 History of the Theatre: Seventeenth Century to the Present 3
Required courses in chosen subplan 5
Essential Studies/General Elective courses 12
Credits 15

Total Credits 120

Majors are required to meet with their faculty adviser each semester before registering for classes.

Students must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)

Students are also encouraged to study abroad at some point in their studies. They should consult with their adviser to plan for this worthwhile educational experience.

Visual Arts

B.A. with Major in Visual Arts (p. 261)

B.F.A. with Major in Visual Arts - Ceramics Emphasis
B.F.A with Major in Visual Arts - Jewelry & Metalsmithing Emphasis
B.F.A. with Major in Visual Arts - Painting Emphasis
B.F.A. with Major in Visual Arts - Drawing Emphasis
B.F.A. with Major in Visual Arts - Photography Emphasis
B.F.A. with Major in Visual Arts - Printmaking Emphasis
B.F.A. with Major in Visual Arts - Sculpture Emphasis

B.A. with Major in Visual Arts

Freshman Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ART 112 Two &amp; Three Dimensional Design</td>
<td>3</td>
</tr>
<tr>
<td>ART 130 Drawing I</td>
<td>3</td>
</tr>
<tr>
<td>Essential Studies Elective</td>
<td>3</td>
</tr>
<tr>
<td>Essential Studies Elective</td>
<td>3</td>
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<tr>
<td>Essential Studies Elective</td>
<td>3</td>
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<tr>
<td>Credits</td>
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Spring

200 Level 2D Studio Art Course 3
Students must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)
### B.F.A with Major in Visual Arts - Jewelry & Metalsmithing Emphasis

#### Freshman Year

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<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ART 112 Two &amp; Three Dimensional Design</td>
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</tr>
<tr>
<td>ART 210 History of Art I</td>
<td>3</td>
</tr>
<tr>
<td>ART 130 Drawing I</td>
<td>3</td>
</tr>
<tr>
<td>Essential Studies Elective</td>
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<tr>
<td>Essential Studies Elective</td>
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<tr>
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<table>
<thead>
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<tr>
<td>Essential Studies Elective</td>
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<tr>
<td>Essential Studies Elective</td>
<td>3</td>
</tr>
<tr>
<td>ART 114 Art &amp; Design: First Year Seminar</td>
<td>3</td>
</tr>
<tr>
<td>ART 211 History of Art II</td>
<td>3</td>
</tr>
<tr>
<td>ART 230 Intro to Drawing</td>
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#### Sophomore Year

<table>
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<th>Fall</th>
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<tr>
<td>200 Level 2D Studio Art Course</td>
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<tr>
<td>Essential Studies Elective</td>
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<tr>
<td>Essential Studies Elective</td>
<td>3</td>
</tr>
<tr>
<td>ART 212 Concepts of Art</td>
<td>3</td>
</tr>
<tr>
<td>ART 204 Intro to Jewelry &amp; Metalsmithing</td>
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<table>
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<td>Essential Studies Elective</td>
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<td>Essential Studies Elective</td>
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<tr>
<td>ART 305 Jewelry and Metalsmithing II</td>
<td>3</td>
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<tr>
<td>ART 273 Intro to Graphic Design</td>
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<td><strong>BFA Application</strong></td>
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<td><strong>Credits</strong></td>
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#### Junior Year

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<tbody>
<tr>
<td>400 Level Art History</td>
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<tr>
<td>200-300 Level 2D Studio Art Course</td>
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<td>Essential Studies Elective</td>
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<tr>
<td>Essential Studies Elective</td>
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<tr>
<td>ART 401 Advanced Jewelry and Metalsmithing</td>
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<tr>
<td>200-300 Level 3D Studio Art Course</td>
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<tr>
<td>Essential Studies Elective</td>
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<tr>
<td>Essential Studies Elective</td>
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<tr>
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### B.F.A with Major in Visual Arts - Painting Emphasis

#### Freshman Year

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<tr>
<td>ART 130 Drawing I</td>
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<tr>
<td>ART 210 History of Art I</td>
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<tr>
<td>Essential Studies Elective</td>
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<td>Essential Studies Elective</td>
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<tr>
<td>ART 114 Art &amp; Design: First Year Seminar</td>
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<tr>
<td>ART 211 History of Art II</td>
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<tr>
<td>ART 230 Intro to Drawing</td>
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#### Sophomore Year

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<tr>
<td>Essential Studies Elective</td>
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<td>ART 305 Jewelry and Metalsmithing II</td>
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<td>Essential Studies Elective</td>
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<tr>
<td>ART 212 Concepts of Art</td>
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<tr>
<td>ART 220 Intro to Painting</td>
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### Credits

**Total Credits**: 120

Students must complete enough electives to bring total credit hours up to 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)
Junior Year
Fall
400 Level Art History 3
200-300 Level 2D Studio Art Course 3
Essential Studies Elective 3
Essential Studies Elective 3
ART 402 Advanced Painting 3
Credits 15

Spring
Essential Studies Elective 3
400 Level Art History 3
ART 402 Advanced Painting 3
200-300 Level 3D Studio Art Course 3
ART 494 Professional Exhibition 3
Annual BFA Review
Credits 15

Senior Year
Fall
400 Level Painting Course 3
300-400 Level Studio Art or Art History 3
300-400 Level Studio Art or Art History 3
ART 402 Advanced Painting 3
Essential Studies Elective 3
Credits 15

Spring
300-400 Level Studio Art or Art History 3
300-400 Level Studio Art or Art History 3
Elective 3
BFA Art Exhibition
ART 402 Advanced Painting 3
ART 498 Seminar in Art and Design Capstone 3
Credits 15

Total Credits 120

Students must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)

B.F.A. with Major in Visual Arts - Drawing Emphasis

Freshman Year
Fall
ART 112 Two & Three Dimensional Design 3
ART 130 Drawing I 3
ART 210 History of Art I 3
Essential Studies Elective 3
Essential Studies Elective 3
Credits 15

Spring
ART 114 Art & Design: First Year Seminar 3
ART 211 History of Art II 3
ART 230 Intro to Drawing 3
Essential Studies Elective 3
Essential Studies Elective 3
Credits 15

Sophomore Year
Fall
200 Level 2D Studio Art Course 3
ART 212 Concepts of Art 3
ART 430 Advanced Painting & Drawing 3
Essential Studies Elective 3
Essential Studies Elective 3
Credits 15

Spring
ART 430 Advanced Drawing 3
200 Level 2D Studio Art Course 3
Essential Studies Elective 3
ART 273 Intro to Graphic Design 3
Essential Studies Elective 3
BFA Application
Credits 15

Junior Year
Fall
Essential Studies Elective 3
400 Level Art History 3
200-300 Level 2D Studio Art Course 3
ART 430 Advanced Drawing 3
Essential Studies Elective 3
Credits 15

Spring
400 Level Art History 3
200-300 Level 3D Studio Art Course 3
ART 430 Advanced Drawing 3
ART 494 Professional Exhibition 3
Essential Studies Elective 3
Credits 15

Senior Year
Fall
300-400 Level Studio Art or Art History 3
300-400 Level Studio Art or Art History 3
ART 430 Advanced Drawing 3
ART 490 Special Projects/ Independent Research (drawing) 3
Essential Studies Elective 3
Credits 15

Spring
300-400 Level Studio Art or Art History 3
300-400 Level Studio Art or Art History 3
ART 430 Advanced Drawing 3
ART 498 Seminar in Art and Design Capstone 3
Elective 3
BFA Art Exhibition
Credits 15

Total Credits 120

Students must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)

B.F.A. with Major in Visual Arts - Photography Emphasis

Freshman Year
Fall
ART 112 Two & Three Dimensional Design 3
ART 210 History of Art I 3
ART 130 Drawing I 3
Essential Studies Elective 3
Credits 15

Sophomore Year
Fall
200 Level 2D Studio Art Course 3
ART 212 Concepts of Art 3
ART 430 Advanced Painting & Drawing 3
Essential Studies Elective 3
Essential Studies Elective 3
Credits 15

Spring
ART 430 Advanced Drawing 3
200 Level 2D Studio Art Course 3
Essential Studies Elective 3
ART 273 Intro to Graphic Design 3
Essential Studies Elective 3
BFA Application
Credits 15

Junior Year
Fall
Essential Studies Elective 3
400 Level Art History 3
200-300 Level 2D Studio Art Course 3
ART 430 Advanced Drawing 3
Essential Studies Elective 3
Credits 15

Spring
400 Level Art History 3
200-300 Level 3D Studio Art Course 3
ART 430 Advanced Drawing 3
ART 494 Professional Exhibition 3
Essential Studies Elective 3
Credits 15

Senior Year
Fall
300-400 Level Studio Art or Art History 3
300-400 Level Studio Art or Art History 3
ART 430 Advanced Drawing 3
ART 490 Special Projects/ Independent Research (drawing) 3
Essential Studies Elective 3
Credits 15

Spring
300-400 Level Studio Art or Art History 3
300-400 Level Studio Art or Art History 3
ART 430 Advanced Drawing 3
ART 498 Seminar in Art and Design Capstone 3
Elective 3
BFA Art Exhibition
Credits 15

Total Credits 120

Students must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)
<table>
<thead>
<tr>
<th>Semester</th>
<th>Courses</th>
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<tbody>
<tr>
<td><strong>Freshman Year</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Fall</strong></td>
<td>ART 112 Two &amp; Three Dimensional Design 3</td>
</tr>
<tr>
<td></td>
<td>ART 210 History of Art I 3</td>
</tr>
<tr>
<td></td>
<td>ART 130 Drawing I 3</td>
</tr>
<tr>
<td></td>
<td>Essential Studies Elective 3</td>
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<td><strong>Fall</strong></td>
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**B.F.A. with Major in Visual Arts - Printmaking Emphasis**

**Freshman Year**

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<tr>
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<th>Course</th>
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<td>ART 210 History of Art I</td>
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<td>ART 130 Drawing I</td>
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**Junior Year**

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### Visual Arts

#### B.F.A. with Major in Visual Arts - Sculpture Emphasis

**Freshman Year**

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<tr>
<td>ART 112  Two &amp; Three Dimensional Design</td>
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**Spring**

| ART 114  Art & Design: First Year Seminar | 3 |
| ART 211  History of Art II | 3 |
| ART 230  Intro to Drawing | 3 |
| Essential Studies Elective | 3 |
| Essential Studies Elective | 3 |
| Credits | 15 |

**Sophomore Year**

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<tr>
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<tr>
<td>ART 212  Concepts of Art</td>
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<tr>
<td>ART 200  Intro to Sculpture</td>
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**Spring**

| ART 273  Intro to Graphic Design | 3 |
| ART 301  Sculpture II | 3 |
| 200 Level 3D Studio Art Course | 3 |
| Essential Studies Elective | 3 |
| Essential Studies Elective | 3 |
| BFA Application | 3 |
| Credits | 15 |

**Junior Year**

<table>
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<tr>
<th>Fall</th>
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<tr>
<td>ART 400  Advanced Sculpture</td>
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<td>400 Level Art History</td>
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<td>200-300 Level 2D Studio Art Course</td>
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**Spring**

| ART 494  Professional Exhibition | 3 |
| ART 400 Advanced Sculpture | 3 |
| 200-300 Level 3D Studio Art Course | 3 |
| Annual BFA Review | 3 |
| 400 Level Art History | 3 |
| Essential Studies Elective | 3 |
| Credits | 15 |

**Senior Year**

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<td>ART 498  Seminar in Art and Design Capstone</td>
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#### Visual Arts

#### B.A. with Major in Visual Arts

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**Spring**

| ART 114  Art & Design: First Year Seminar | 3 |
| ART 210  History of Art I | 3 |
| ART 230  Intro to Drawing | 3 |
| Essential Studies Elective | 3 |
| Essential Studies Elective | 3 |
| Essential Studies Elective | 3 |
| Essential Studies Elective | 3 |
| Essential Studies Elective | 3 |
| Credits | 15 |

**Sophomore Year**

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<td>ART 200  Intro to Sculpture</td>
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**Spring**

| ART 273  Intro to Graphic Design | 3 |
| ART 301  Sculpture II | 3 |
| 200 Level 3D Studio Art Course | 3 |
| Essential Studies Elective | 3 |
| Essential Studies Elective | 3 |
| Essential Studies Elective | 3 |
| BFA Application | 3 |
| Credits | 15 |

**Junior Year**

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**Spring**

| ART 494  Professional Exhibition | 3 |
| ART 400 Advanced Sculpture | 3 |
| 200-300 Level 3D Studio Art Course | 3 |
| Annual BFA Review | 3 |
| 400 Level Art History | 3 |
| Essential Studies Elective | 3 |
| Credits | 15 |

**Credits**

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Vocal Performance

B.M. with Major in Vocal Performance (Even Fall Entry) (p. 267)

B.M. with Major in Vocal Performance (Odd Fall Entry)

B.M. with Major in Vocal Performance (Even Fall Entry)

Freshman Year

Fall

MUSC 130  Music Theory I  3
MUSC 131  Aural Skills I  1
MUSC 133  Keyboard Skills I KS
or MUSC 154
or Individual Lessons 1
MUSC 155  Individual Lessons 1
Major Ensemble Consult Advisor 1
ENGL 110  College Composition I 3

Credits 15

Junior Year

Fall

400 Level Art History 3
300-400 Level Studio Art or Art History
Elective 3
Elective 3
Essential Studies Elective 3

Credits 15

Spring

300-400 Level Studio Art Course 3
Elective 3
Elective 3
300-400 Level Studio Art Course 3

Credits 15

Senior Year

Fall

300-400 Level Studio Art or Art History
Elective 3
Elective 3
Elective 3
300-400 Level Studio Art or Art History 3

Credits 15

Spring

Elective 3
Elective 3
ART 498  Seminar in Art and Design Capstone 3
Elective 3

Credits 15

Total Credits 120

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### B.M. with Major in Vocal Performance (Odd Fall Entry)

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<td>MUSC 131 Aural Skills I</td>
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<td>MUSC 133 Keyboard Skills I or MUSC 154</td>
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<td>MUSC 155 Individual Lessons</td>
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<td>ENGL 110 College Composition I</td>
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#### Spring

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<td>MUSC 134 Music Theory II</td>
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<td>MUSC 135 Aural Skills II</td>
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<td>MUSC 136 Keyboard Skills II or MUSC 154</td>
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<td>MUSC 155 Individual Lessons</td>
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<tr>
<td>ENGL 130 Composition II: Writing for Public Audiences</td>
</tr>
<tr>
<td>Essential Studies Social Science</td>
</tr>
<tr>
<td>Music Electives</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
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</table>

#### Sophomore Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MUSC 230 Music Theory III</td>
<td>3</td>
</tr>
<tr>
<td>MUSC 231 Aural Skills III</td>
<td>1</td>
</tr>
<tr>
<td>MUSC 233 Keyboard Skills III or MUSC 254</td>
<td>1</td>
</tr>
<tr>
<td>MUSC 255 Individual Lessons</td>
<td>2</td>
</tr>
<tr>
<td>MUSC 256 Basic Conducting</td>
<td>2</td>
</tr>
<tr>
<td>Major Ensemble</td>
<td>1</td>
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<tr>
<td>FREN 101 First Year French I or GERM 101</td>
<td>4</td>
</tr>
<tr>
<td>COMM 110 Fundamentals of Public Speaking</td>
<td>3</td>
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</table>

#### Junior Year

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>MUSC 242 Diction for Singers (English/French)</td>
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<tr>
<td>MUSC 455 Individual Lessons</td>
<td>4</td>
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<tr>
<td>MUSC 355 Junior Recital</td>
<td>1</td>
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<tr>
<td>Essential Studies Math/Science/Technology</td>
<td>3</td>
</tr>
<tr>
<td>Major Ensemble</td>
<td>1</td>
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<tr>
<td>Electives</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
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#### Senior Year

<table>
<thead>
<tr>
<th>Fall</th>
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</thead>
<tbody>
<tr>
<td>MUSC 444 Applied Music Pedagogy</td>
<td>2</td>
</tr>
<tr>
<td>MUSC 455 Individual Lessons</td>
<td>4</td>
</tr>
<tr>
<td>Major Ensemble</td>
<td>1</td>
</tr>
<tr>
<td>Chamber Ensemble</td>
<td>1</td>
</tr>
<tr>
<td>Essential Studies Math/Science/Technology</td>
<td>3</td>
</tr>
<tr>
<td>Essential Studies Social Science</td>
<td>3</td>
</tr>
<tr>
<td>Music Electives</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
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</table>

<table>
<thead>
<tr>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MUSC 269 Opera Workshop</td>
<td>1</td>
</tr>
<tr>
<td>MUSC 459 Senior Recital</td>
<td>1-2</td>
</tr>
<tr>
<td>MUSC 490 Seminar in Music</td>
<td>3</td>
</tr>
<tr>
<td>Major Ensemble</td>
<td>1</td>
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<tr>
<td>Music Electives</td>
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<tr>
<td>Electives</td>
<td>3</td>
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<tr>
<td><strong>Total Credits</strong></td>
<td><strong>15-16</strong></td>
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</tbody>
</table>

1 = On Voice. KS = Keyboard Skills or Piano Lessons.

Students must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)
College of Business and Public Administration

B.ACC in Accountancy (p. 269)

B.B.A. with Major in Airport Management (p. 270)

B.B.A. with Major in Banking & Financial Economics (p. 271)

B.B.A. with Major in Business Economics (p. 272)

B.B.A. with Major in Entrepreneurship (p. 273)

B.B.A. with Major in Human Resource Management (p. 274)

B.B.A. with Major in Information Systems (p. 275)

B.B.A. with Major in Investments (p. 276)

B.B.A. with Major in Management (p. 276)

B.B.A. with Major in Managerial Finance & Accounting (p. 277)

B.B.A. with Major in Marketing (p. 278)

B.B.A. with Major in Operations and Supply Chain Management (p. 278)

B.A. with Major in Political Science (p. 279)

B.S. with Major in Public Affairs (p. 279)

Accountancy

B.ACC in Accountancy (CPA Track) (p. 269)

B.ACC in Accountancy (Non-CPA track)

B.ACC in Accountancy (CPA Track)

Freshman Year

Fall
ENGL 110 College Composition I 3
MATH 103 College Algebra 3
POLS 115 American Government I 3
PSYC 111 or SOC 110 or ANTH 171 Introduction to Psychology 3
or Introduction to Sociology or Introduction to Cultural Anthropology
Essential Studies 3

Credits 15

Spring
ACCT 200 Elements of Accounting I 3
COMM 110 Fundamentals of Public Speaking 3
ENGL 130 Composition II: Writing for Public Audiences 3
MATH 146 Applied Calculus I 3
Essential Studies 3

Credits 15

Sophomore Year

Fall
ACCT 201 Elements of Accounting II 3
ECON 201 Principles of Microeconomics 3
ISBC 217 Personal Productivity with Information Technology 1
Essential Studies 3
Essential Studies:Lab Science 4
Free Elective 1

Credits 15

Spring
ACCT 301 Intermediate Accounting I 3
ACCT 218 Advanced Spreadsheet Applications 3

ECON 202 Principles of Macroeconomics 3
ECON 210 Introduction to Business and Economic Statistics 3
ISBC 217 Fundamentals of Computer Information Systems 3
Free Elective 1

Credits 18

Junior Year

Fall
ACCT 302 Intermediate Accounting II 3
ACCT 320 Cost Accounting 3
FIN 310 Principles of Financial Management 3
MRKT 305 Marketing Foundations 3
MGMT 300 Principles of Management 3
Free Elective 3

Credits 18

Spring
ACCT 397 Cooperative Education 1
ACCT 497 Accounting Internship 2 5

Credits 6

Senior Year

Fall
ACCT 309 Accounting Information Systems 3
ACCT 511 Taxation of Businesses (also fulfills ACCT 411 Ugrad requirement) 3
ECON 303 Money and Banking 3
MGMT 301 Operations Management 3
Essential Studies 3
Free Elective 1

Credits 16

Spring
ACCT 315 Business Law I 3
ACCT 405 Assurance Services 3
ACCT 503 Advanced Financial Accounting (also fulfills Ugrad Acct Elective) 3
MGMT 475 Strategic Management (Essential Studies) 3
Free Elective 4

Credits 16

Fifth Year

Fall
ACCT 504 Seminar in Auditing 3
ISBC 510 Business Intelligence 3
BADM 500 The Successful MBA--Executive Skills 2
MGMT 505 Organization Leadership and Ethics 2
Grad Concentration Course 3
Free Elective 3

Credits 16

Spring
ACCT 501 Seminar in Accounting Issues 3
GRAD ACCT Elective 3
Grad Concentration Course 3
Grad Concentration Course 3
Free Elective 3

Credits 15

Total Credits 150

1. Students are encouraged to take ACCT 160 if offered. Free electives may also be used to satisfy some requirements of minors and/or second majors.

2. Three credits of ACCT 497 fulfills one 3-credit undergraduate accounting elective, with the remaining combination of ACCT 497 and ACCT 397 credits representing free elective credits. Internships are not required, but are encouraged. Students who choose not to pursue full-time internship opportunities may substitute an undergraduate accounting elective and an open elective for the 6 internship and coop credits in this plan, and continue fulfilling to balance the 5-year plan with some shifting of courses across semesters.
to balance credit loads. For students electing full-time internships, online, summer, and/or courses offered in accelerated formats may be taken in the semester/summer following a full-time internship to balance credit loads.

Please Note: Students enrolled in the ABM Bachelor/Master of Accountancy program will be able to further accelerate this plan by using an additional 6 credits of graduate course work to fulfill undergraduate credit requirements.

Students in both the combined and AMB Bachelor/Master of Accountancy programs should consider the 150 credit requirement to sit for the CPA exam. Depending on the amount of credit earned prior to entering these programs, students may need to complete credits beyond those required by the degrees in order to meet the 150 credits required to sit for the CPA exam.

Students must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)

B.ACC in Accountancy (Non-CPA track)

Freshman Year

Fall
ENGL 110 College Composition I 3
MATH 103 College Algebra 3
POLS 115 American Government I 3
PSYC 111 or SOC 110 or ANTH 171 Introduction to Psychology or Introduction to Sociology or Introduction to Cultural Anthropology 3

Credits 15

Essential Studies 3

Spring
COMM 110 Fundamentals of Public Speaking 3
MATH 146 Applied Calculus I 3
ENGL 130 Composition II: Writing for Public Audiences 3

Credits 15

Sophomore Year

Fall
ACCT 200 Elements of Accounting I 3
ECON 201 Principles of Microeconomics 3
ISBC 117 Personal Productivity with Information Technology 1

Credits 15

Essential Studies: Lab Science 4
Free Elective 3
Free Elective 1

Junior Year

Fall
ACCT 301 Intermediate Accounting I 3
ACCT 320 Cost Accounting 3
MGMT 300 Principles of Management 3
MRKT 305 Marketing Foundations 3
ISBC 217 Fundamentals of Computer Information Systems 3

Credits 15

Spring
ACCT 302 Intermediate Accounting II 3
ACCT 309 Accounting Information Systems 3
ACCT 315 Business Law I 3
Essential Studies 3
Free Elective 3

Credits 15

Senior Year

Fall
ACCT 404 Assurance Services 3
FIN 310 Principles of Financial Management 3
MGMT 301 Operations Management 3
Accounting Elective 2 3
Free Elective 3

Credits 15

Spring
ACCT 411 Business Income Taxation 3
MGMT 475 Strategic Management 3
ECON 303 Money and Banking 3
Accounting Elective 2 3
Free Elective 3

Credits 15

Total Credits 120

COMMENT: This four year plan results in graduation with 120 credits, but does NOT satisfy all eligibility requirements for taking the CPA exam (150 credit hours are required)! Students interested in pursuing the CPA certification are encouraged to consider the combined or ABM BAcc/MAcc programs and view the related 5-year plan.

1. Students must complete enough open electives to bring total credit hours up to 120.

2. The following courses count as accounting electives: ACCT 312, 316, 401, 403, 408, 410, 412, 416, 450, 494, and 497.

3. When offered, students are encouraged to take ACCT 160 to fulfill this requirement.

Students must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)

Airport Management

B.B.A. with Major in Airport Management

Freshman Year

Fall
ENGL 110 College Composition I 3
MATH 103 College Algebra 3
AVIT 100 Fundamentals of Computer Information Systems 3

Credits 15

Junior Year

Fall
ACCT 301 Intermediate Accounting I 3
ACCT 320 Cost Accounting 3
MGMT 300 Principles of Management 3
MRKT 305 Marketing Foundations 3
ISBC 217 Fundamentals of Computer Information Systems 3

Credits 15

Spring
ACCT 302 Intermediate Accounting II 3
ACCT 309 Accounting Information Systems 3
ACCT 315 Business Law I 3
Essential Studies 3
Free Elective 3

Credits 15

Senior Year

Fall
ACCT 405 Assurance Services 3
FIN 310 Principles of Financial Management 3
MGMT 301 Operations Management 3
Accounting Elective 2 3
Free Elective 3

Credits 15

Spring
ACCT 411 Business Income Taxation 3
MGMT 475 Strategic Management 3
ECON 303 Money and Banking 3
Accounting Elective 2 3
Free Elective 3

Credits 15

Total Credits 120

COMMENT: This four year plan results in graduation with 120 credits, but does NOT satisfy all eligibility requirements for taking the CPA exam (150 credit hours are required)! Students interested in pursuing the CPA certification are encouraged to consider the combined or ABM BAcc/MAcc programs and view the related 5-year plan.

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3. When offered, students are encouraged to take ACCT 160 to fulfill this requirement.

Students must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)
Banking & Financial Economics

B.B.A. with Major in Banking & Financial Economics

Freshman Year

Fall

ENGL 110    College Composition I  3
MATH 103    College Algebra 3
or MATH 146  or Applied Calculus I
or MATH 165  or Calculus I
Essential Studies: Oral Communication 3
Free Elective 3
Essential Studies: Fine Arts 3

Credits 15

Spring

ENGL 130    Composition II: Writing for Public Audiences 3
Essential Studies: Humanities 3
Essential Studies: Global Diversity 3
Electives 6

Credits 15

Sophomore Year

Fall

ECON 201 Principles of Microeconomics 3
ACCT 200 Elements of Accounting I 3
Essential Studies: Lab Science 4
Essential Studies: Fine Arts or Humanities 3
Essential Studies: Social Science (Non-Economics Course) 3

Credits 16

Spring

ECON 202 Principles of Macroeconomics 3
ECON 210 Introduction to Business and Economic Statistics 3
ACCT 201 Elements of Accounting II 3
ISBC 217 Fundamentals of Computer Information Systems 3
Electives 3

Credits 15

Junior Year

Fall

ECON 308 Intermediate Microeconomic Theory 3
ECON 438 International Money and Finance 3
FIN 310 Principles of Financial Management 3
ECON 303 Money and Banking 3
MGMT 300 Principles of Management 3

Credits 15

Spring

ECON 405 Bank Regulation 3
FIN 360 Capital Market Financing and Investment Strategies 3
ECON 309 Intermediate Macroeconomic Theory and Policy 3
FIN 340 Intermediate Financial Management 3
MRKT 305 Marketing Foundations 3

Credits 15

Senior Year

Fall

ECON 305 Principles of Banking I 3
MGMT 301 Operations Management 3
ACCT 315 Business Law I 3
Major Electives 6

Credits 15

Spring

ECON 306 Principles of Banking II 3
MGMT 475 Strategic Management 3

Credits 3

Students must complete enough electives to bring total credit hours up to 120. Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)
Major Electives 3
Electives 5
Credits 14

Total Credits 120

Students must complete enough electives to bring total credit hours up to the 120. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)

Business Economics

B.B.A. with Major in Business Economics

Freshman Year

Fall
ENGL 110 College Composition I 3
MATH 103 College Algebra
or MATH 146 or Applied Calculus I
or MATH 165 or Calculus I
3
Essential Studies: Fine Arts 3
Essential Studies: Oral Communications 3
Free Elective 3
Credits 15

Spring
ENGL 130 Composition II: Writing for Public Audiences 3
Essential Studies: Humanities 3
Essential Studies: Global Diversity 3
Electives 6
Credits 15

Sophomore Year

Fall
ACCT 200 Elements of Accounting I 3
ECON 201 Principles of Microeconomics 3
Essential Studies: Lab Science 4
Essential Studies: Fine Arts or Humanities 3
Essential Studies: Social Science (Non-Economics course) 3
Credits 16

Spring
ECON 210 Introduction to Business and Economic Statistics 3
ACCT 201 Elements of Accounting II 3
ECON 202 Principles of Macroeconomics 3
ISBC 217 Fundamentals of Computer Information Systems 3
Electives 3
Credits 15

Junior Year

Fall
ECON 303 Money and Banking 3
FIN 310 Principles of Financial Management 3
ECON 308 Intermediate Microeconomic Theory 3
MGMT 300 Principles of Management 3
Electives 3
Credits 15

Spring
ECON 338 International Economics 3
ECON 309 Intermediate Macroeconomic Theory and Policy 3
MGMT 301 Operations Management 3
Electives 3
Credits 15

Senior Year

Fall
ECON 410 Empirical Methods in Economics I 3
ECON Electives 3
Special Emphasis: Advanced Communication ISBC 320 is recommended 3
Electives 6
Credits 15

Spring
MGMT 475 Strategic Management 3
ECON 414 Managerial Economics 3
ECON Electives 6
Electives 2
Credits 14
Total Credits 120

Students must complete enough electives to bring total credit hours up to the 120. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)

Economics

B.B.A. with Major in Business Economics

Freshman Year

Fall
ENGL 110 College Composition I 3
MATH 103 College Algebra
or MATH 146 or Applied Calculus I
or MATH 165 or Calculus I
3
Essential Studies: Fine Arts 3
Essential Studies: Oral Communications 3
Free Elective 3
Credits 15

Spring
ENGL 130 Composition II: Writing for Public Audiences 3
Essential Studies: Humanities 3
Essential Studies: Global Diversity 3
Electives 6
Credits 15

Sophomore Year

Fall
ACCT 200 Elements of Accounting I 3
ECON 201 Principles of Microeconomics 3
Essential Studies: Lab Science 4
Essential Studies: Fine Arts or Humanities 3
Essential Studies: Social Science (Non-Economics course) 3
Credits 16

Spring
ECON 210 Introduction to Business and Economic Statistics 3
ACCT 201 Elements of Accounting II 3
ECON 202 Principles of Macroeconomics 3
ISBC 217 Fundamentals of Computer Information Systems 3
Electives 3
Credits 15

Junior Year

Fall
ECON 303 Money and Banking 3
FIN 310 Principles of Financial Management 3
ECON 308 Intermediate Microeconomic Theory 3
MGMT 300 Principles of Management 3
Electives 3
Credits 15

Spring
ECON 338 International Economics 3
ECON 309 Intermediate Macroeconomic Theory and Policy 3
MGMT 301 Operations Management 3
Electives 3
Credits 15
Students must complete enough electives to bring total credit hours up to the 120. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)

## Graphic Design Technology

**B.S. with Major in Graphic Design Technology**

<table>
<thead>
<tr>
<th>Freshman Year</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
</tr>
<tr>
<td>ENGL 130</td>
<td>3</td>
</tr>
<tr>
<td>ECON 210</td>
<td>3</td>
</tr>
<tr>
<td>TECH 102</td>
<td>4</td>
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<tr>
<td>TECH 122</td>
<td>3</td>
</tr>
<tr>
<td>TECH 202</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 110</td>
<td>3</td>
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<tr>
<td>ENTR 200</td>
<td>3</td>
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<tr>
<td>ENTR 201</td>
<td>3</td>
</tr>
<tr>
<td>Essential Studies Social Sciences (See recommended list below)</td>
<td>3</td>
</tr>
<tr>
<td>Total Credits</td>
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</tr>
</tbody>
</table>

Students must complete enough electives to bring total credit hours up to the 120. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)
### Sophomore Year

**Fall**

- Essential Studies Oral Communication 3
- Open Elective You must complete enough open electives to bring the total credit hours to 125 3
- TECH 212 Visual Literacy 3
- TECH 311 Computers and Emerging Technologies 3
- ENTR 201 The Entrepreneur and the Enterprise 3

**Credits** 15

**Spring**

- Essential Studies/Special Emphasis: Quantitative 3
- See recommended list below 3
- Open Elective You must complete enough open electives to bring the total credit hours to 125 3
- TECH 300 Technology and Society 3
- ENTR 306 Accounting and Financial Concepts for Entrepreneurship 3

**Credits** 15

### Junior Year

**Fall**

- Essential Studies Social Science See list of recommended courses below 3
- TECH 362 Intermediate Graphic Design and Print Production 3
- Open Elective You must complete enough open electives to bring the total credit hours to 125 1
- ENTR 305 3
- TECH 332 Industrial Design 3
- TECH 232 Web Design 3

**Credits** 15

**Spring**

- Open Elective 3
- Essential Studies/Special Emphasis: Global Diversity 3
- Essential Studies/Special Emphasis: United States Diversity 3
- Open Elective You must complete enough open electives to bring the total credit hours to 125 2
- ENTR 366 3
- TECH 342 3

**Credits** 17

### Senior Year

**Fall**

- Tech 322 Fundamentals of Photography (Essential Studies/FA) 3
- Essential Studies/Special Emphasis: Advanced Communication 3
- Essential Studies Social Science (see recommended list below) 3
- TECH 442 Industrial/Applied Graphic Design 3
- TECH 498 Senior Capstone I 1
- ENTR 385 Entrepreneurial Opportunities and Concept Development 3

**Credits** 16

**Spring**

- Open Elective You must complete enough open electives to bring the total credit hours to 125 3
- Open Elective You must complete enough open electives to bring the total credit hours to 125 3
- TECH 452 Multimedia Production 3
- TECH 422 Advanced Digital Photography and Imaging 3
- TECH 499 Senior Capstone II 3

**Credits** 15

Total Credits 125

### Human Resource Management

**B.B.A. with Major in Human Resource Management**

**Freshman Year**

**Fall**

- MATH 103 College Algebra 3
- ENGL 110 College Composition I 3
- Essential Studies: Fine Arts 3
- Essential Studies: Social Science (PSYC 111 Recommended) 3
- Free Elective 3

**Credits** 15

**Spring**

- ENGL 130 Composition II: Writing for Public Audiences 3
- ECON 201 Principles of Microeconomics 3
- Essential Studies: Lab Science 4
- Essential Studies: Oral Communication 3
- Essential Studies: Fine Arts or Humanities 3

**Credits** 16

### Sophomore Year

**Fall**

- ACCT 200 Elements of Accounting I 3
- ECON 202 Principles of Macroeconomics 3
- ISBC 217 Fundamentals of Computer Information Systems 3
- Essential Studies: Humanities 3
- Free Elective 2-3

**Credits** 14-15

**Spring**

- ACCT 201 Elements of Accounting II 3
- ECON 210 Introduction to Business and Economic Statistics 3
- MGMT 300 Principles of Management 3
- Essential Studies: Diversity 3
- Essential Studies: Advanced Communication 3

**Credits** 15

### Junior Year

**Fall**

- MGMT 301 Operations Management 3
- MGMT 302 Human Resource Management 3
- MRKT 305 Marketing Foundations 3
- Essential Studies: Diversity 3
- Free Elective: (ACCT 315 Business Law Recommended) 3

**Credits** 15

**Spring**

- FIN 310 Principles of Financial Management 3
- MGMT 310 Organizational Behavior 3
- MGMT 400 Organizational Theory and Analysis 3
- Human Resource Management Elective 3
- Free Elective 3

**Credits** 15

### Senior Year

**Fall**

- MGMT 412 Training and Development 3
- MGMT 407 Wage and Salary Administration 3
- Human Resource Management Elective 3
- Free Elective 6

**Credits** 15

**Notes:**

- Each student must fulfill all University, Departmental, and Essential Studies requirements. Essential Studies requirements are found at http://und.edu/academics/essential-studies/requirements.cfm

- Strongly recommended courses for your Essential Studies area/open elective:
  - COMM 102;
  - CSCI 101/T;
  - SOC 110;
  - ART 112;
  - ART 114;
  - LEAD 101;
  - ANTH 171;
  - SOC 250;
  - ISYS 320. Please see your Advisor.
### Industrial Technology

#### B.S in Industrial Technology

**Freshman Year**

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>TECH 110</td>
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<tr>
<td>TECH 122</td>
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<tr>
<td>MATH 103</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 161</td>
<td>4</td>
</tr>
<tr>
<td>ENGL 110</td>
<td>3</td>
</tr>
<tr>
<td><strong>Credits</strong></td>
<td><strong>15</strong></td>
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</table>

**Spring**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>TECH 202</td>
<td>3</td>
</tr>
<tr>
<td>TECH 203</td>
<td>3</td>
</tr>
<tr>
<td>MATH 105</td>
<td>2</td>
</tr>
<tr>
<td>PHYS 162</td>
<td>4</td>
</tr>
<tr>
<td>ENGL 130</td>
<td>3</td>
</tr>
<tr>
<td><strong>Credits</strong></td>
<td><strong>15</strong></td>
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</table>

**Sophomore Year**

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>MATH 146</td>
<td>3</td>
</tr>
<tr>
<td>ECON 210</td>
<td>3</td>
</tr>
<tr>
<td>TECH 201</td>
<td>3</td>
</tr>
<tr>
<td>TECH 204</td>
<td>4</td>
</tr>
<tr>
<td><strong>Credits</strong></td>
<td><strong>13</strong></td>
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</table>

**Spring**

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>TECH 330</td>
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</tr>
<tr>
<td>MGMT 300</td>
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<tr>
<td>PHIL 250</td>
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<tr>
<td>ISBC 117</td>
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<tr>
<td>LEAD 101</td>
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<tr>
<td>TECH 211</td>
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**Junior Year**

**Fall**

<table>
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<tbody>
<tr>
<td>TECH 332</td>
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<td>TECH 433</td>
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<td>MGMT 301</td>
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<td>TECH 223</td>
<td>3</td>
</tr>
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<tr>
<td>CHEM 121L</td>
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<td><strong>Credits</strong></td>
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**Spring**

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>TECH 300</td>
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</tbody>
</table>

**Total Credits** 119

Student can pursue courses as a generalist or with emphasis in Electronics or Manufacturing. Tech 223, 204, 213 and 403 for a Manufacturing emphasis. Tech 311, 341, and 451 for Electronics emphasis. Select a mix from the two when pursuing the Generalist option. Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. Essential Studies requirements are found at [http://und.edu/academics/essential-studies/requirements.cfm](http://und.edu/academics/essential-studies/requirements.cfm)

### Information Systems

#### B.B.A. with Major in Information Systems

**Freshman Year**

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>ENGL 110</td>
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</tr>
<tr>
<td>MATH 103</td>
<td>3</td>
</tr>
<tr>
<td>Essential Studies: Fine Arts</td>
<td>3</td>
</tr>
<tr>
<td>Essential Studies: Social Science</td>
<td>3</td>
</tr>
<tr>
<td>Free Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>Credits</strong></td>
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**Spring**

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<td>ECON 201</td>
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<td>ENGL 130</td>
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**Sophomore Year**

**Fall**

<table>
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<tbody>
<tr>
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<td>3</td>
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<tr>
<td>ECON 210</td>
<td>3</td>
</tr>
<tr>
<td>Essential Studies: Humanities</td>
<td>3</td>
</tr>
<tr>
<td>Free Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>Credits</strong></td>
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**Spring**

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
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<td>MGMT 300</td>
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<tr>
<td>ISBC 300</td>
<td>3</td>
</tr>
<tr>
<td>Essential Studies: Fine Arts or Humanities</td>
<td>3</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
</tr>
<tr>
<td>-------------</td>
<td>--------------------------------------------------------</td>
</tr>
<tr>
<td>ENGL 110</td>
<td>College Composition I</td>
</tr>
<tr>
<td>MATH 103</td>
<td>College Algebra</td>
</tr>
<tr>
<td>POLS 115</td>
<td>American Government I</td>
</tr>
<tr>
<td>PSYC 111</td>
<td>Introduction to Psychology or Introduction to Sociology</td>
</tr>
<tr>
<td></td>
<td>or ANTH 171</td>
</tr>
<tr>
<td></td>
<td>Essential Studies: Fine Arts</td>
</tr>
<tr>
<td></td>
<td>Essential Studies: Humanities</td>
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<td></td>
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</tr>
<tr>
<td></td>
<td>Spring</td>
</tr>
<tr>
<td>COMM 110</td>
<td>Fundamentals of Public Speaking</td>
</tr>
<tr>
<td>MATH 146</td>
<td>Applied Calculus I</td>
</tr>
<tr>
<td>ENGL 130</td>
<td>Composition II: Writing for Public Audiences</td>
</tr>
<tr>
<td></td>
<td>Essential Studies: Humanities</td>
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<td>Total Credits</td>
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Please note that every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)

**Investments**

**B.B.A. with Major in Investments**

<table>
<thead>
<tr>
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<tbody>
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<td>MATH 103</td>
<td>College Algebra</td>
</tr>
<tr>
<td>POLS 115</td>
<td>American Government I</td>
</tr>
<tr>
<td>PSYC 111</td>
<td>Introduction to Psychology or Introduction to Sociology</td>
</tr>
<tr>
<td>or ANTH 171</td>
<td>or Introduction to Cultural Anthropology</td>
</tr>
<tr>
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<td>3</td>
</tr>
<tr>
<td>Essential Studies: Humanities</td>
<td>3</td>
</tr>
<tr>
<td>Essential Studies</td>
<td>3</td>
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<tr>
<td>Spring</td>
<td>15</td>
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<tr>
<td>MGMT 405</td>
<td>Strategic Management</td>
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<td>Info Sys Elective</td>
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<td>Essential Studies: Diversity</td>
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<tr>
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**Sophomore Year**

<table>
<thead>
<tr>
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<table>
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<th>Course Title</th>
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<tbody>
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<table>
<thead>
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<th>Course Title</th>
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<td>MATH 103</td>
<td>College Algebra</td>
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</tr>
<tr>
<td>MATH 146</td>
<td>Applied Calculus I</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 130</td>
<td>Composition II: Writing for Public Audiences</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Essential Studies: Humanities</td>
<td>3</td>
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<tr>
<td></td>
<td>Essential Studies</td>
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<tr>
<td></td>
<td>Spring</td>
<td>15</td>
</tr>
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<td>MGMT 475</td>
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<td>Free Elective</td>
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<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tr>
<td>ENGL 110</td>
<td>College Composition I</td>
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<tr>
<td>MATH 103</td>
<td>College Algebra</td>
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</tr>
<tr>
<td>MATH 146</td>
<td>Applied Calculus I</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 130</td>
<td>Composition II: Writing for Public Audiences</td>
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</tr>
<tr>
<td></td>
<td>Essential Studies: Humanities</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Essential Studies</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Spring</td>
<td>15</td>
</tr>
<tr>
<td>MGMT 475</td>
<td>Strategic Management</td>
<td>3</td>
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<tr>
<td>Free Elective</td>
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<td>Total Credits</td>
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</tbody>
</table>

1 = Only offered Fall Semester. 2 = Only offered Spring Semester.

Students must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)

**Management**

**B.B.A. with Major in Management**

<table>
<thead>
<tr>
<th>Freshman Year</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
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<tr>
<td>MATH 103</td>
<td>College Algebra</td>
</tr>
<tr>
<td>MATH 146</td>
<td>Applied Calculus I</td>
</tr>
<tr>
<td>ENGL 130</td>
<td>Composition II: Writing for Public Audiences</td>
</tr>
<tr>
<td></td>
<td>Essential Studies: Humanities</td>
</tr>
<tr>
<td></td>
<td>Essential Studies: Fine Arts</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ENGL 110</td>
<td>College Composition I</td>
<td>3</td>
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<tr>
<td>MATH 103</td>
<td>College Algebra</td>
<td>3</td>
</tr>
<tr>
<td>MATH 146</td>
<td>Applied Calculus I</td>
<td>3</td>
</tr>
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<td>ENGL 130</td>
<td>Composition II: Writing for Public Audiences</td>
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</tr>
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<td></td>
<td>Essential Studies: Humanities</td>
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<tr>
<td></td>
<td>Essential Studies</td>
<td>3</td>
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<tr>
<td></td>
<td>Spring</td>
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</tr>
<tr>
<td>MGMT 475</td>
<td>Strategic Management</td>
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<tr>
<td>Total Credits</td>
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<td>15</td>
</tr>
</tbody>
</table>

1 = Only offered Fall Semester. 2 = Only offered Spring Semester.

Students must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)
## Managerial Finance & Accounting

### B.B.A. with Major in Managerial Finance & Accounting

#### Freshman Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>ENGL 110</td>
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</tr>
<tr>
<td></td>
<td>MATH 103</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>POLS 115</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>PSYC 111</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Essential Studies: Fine Arts</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Essential Studies: Lab Science</td>
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</tr>
<tr>
<td></td>
<td>Free Elective</td>
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<td></td>
<td><strong>Total Credits</strong></td>
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</tr>
<tr>
<td>Spring</td>
<td>ENGL 130</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MATH 130</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MATH 146</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Essential Studies: Fine Arts or Humanities</td>
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<tr>
<td></td>
<td>Essential Studies: Lab Science</td>
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#### Sophomore Year

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<tbody>
<tr>
<td>ACCT 200</td>
<td>Elements of Accounting I</td>
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</tr>
<tr>
<td>ECON 201</td>
<td>Principles of Microeconomics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 210</td>
<td>Introduction to Business and Economic Statistics</td>
<td>3</td>
</tr>
<tr>
<td>ISBC 217</td>
<td>Fundamentals of Computer Information Systems</td>
<td>3</td>
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<tr>
<td>Essential Studies: Humanities</td>
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<td></td>
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<tr>
<td>Essential Studies: Diversity</td>
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<tr>
<td><strong>Total Credits</strong></td>
<td><strong>16</strong></td>
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</tr>
<tr>
<td>Spring</td>
<td>ACCT 201</td>
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</tr>
<tr>
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<td>MGMT 300</td>
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</tr>
<tr>
<td></td>
<td>MRKT 305</td>
<td>3</td>
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<td>Essential Studies: Fine Arts or Humanities</td>
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<td>Essential Studies: Diversity</td>
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#### Junior Year

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<tr>
<td>ACCT 301</td>
<td>Intermediate Accounting I</td>
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<tr>
<td>ACCT 320</td>
<td>Cost Accounting</td>
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<tr>
<td>ACCT 315</td>
<td>Business Law I</td>
<td>3</td>
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<tr>
<td>MGMT 300</td>
<td>Principles of Management</td>
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<tr>
<td>FIN 310</td>
<td>Principles of Financial Management</td>
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<td>Elective</td>
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<td><strong>Total Credits</strong></td>
<td><strong>16</strong></td>
<td></td>
</tr>
<tr>
<td>Spring</td>
<td>ACCT 302</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>ACCT 309</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>FIN 340</td>
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<tr>
<td></td>
<td>MGMT 301</td>
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<td><strong>Total Credits</strong></td>
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</tbody>
</table>

You must complete enough free electives to bring total credit hours up to 120.

Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)
Marketing

B.B.A. with Major in Marketing

Freshman Year

First Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 110</td>
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<td>MATH 103</td>
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<tr>
<td>POLS 115</td>
<td>3</td>
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<tr>
<td>PSYC 111 or SOC 110 or ANTH 171</td>
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Essential Studies: Fine Arts (FA)

<table>
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Second Semester

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Essential Studies: Humanities

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Sophomore Year

First Semester

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<th>Course</th>
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<tbody>
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<td>ACCT 200</td>
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Essential Studies: Fine Arts or Humanities

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Second Semester

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<tr>
<td>ACCT 201</td>
<td>3</td>
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<tr>
<td>ECON 210</td>
<td>3</td>
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<td>MRKT 305</td>
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Electives

<table>
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<tr>
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Junior Year

First Semester

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<th>Course</th>
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<tbody>
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<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
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<td>MRKT 325 or MRKT 310 or MRKT 330</td>
<td>3</td>
</tr>
<tr>
<td>FIN 310</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 300</td>
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</table>

Second Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>MRKT 330 or MRKT 310 or MRKT 325</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 301</td>
<td>3</td>
</tr>
<tr>
<td>ACCT 315</td>
<td>3</td>
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</table>

Marketing Electives

<table>
<thead>
<tr>
<th>Credits</th>
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<tbody>
<tr>
<td>6</td>
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</table>

Senior Year

First Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ECON 303</td>
<td>3</td>
</tr>
<tr>
<td>Marketing Electives</td>
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Essential Studies/Special Emphasis: Advanced Communication

<table>
<thead>
<tr>
<th>Credits</th>
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<tbody>
<tr>
<td>3</td>
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Second Semester

<table>
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</thead>
<tbody>
<tr>
<td>MRKT 450</td>
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<tr>
<td>MGMT 475</td>
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Electives

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Marketing Electives

<table>
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<tr>
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Total Credits

<table>
<thead>
<tr>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>120</td>
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</table>

1 = Marketing 310 and 325 and 330 all MUST be taken SOMETIME in the junior year.

Operations & Supply Chain Management

B.B.A. with Major in Operations and Supply Chain Management

Freshman Year

Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 110</td>
<td>3</td>
</tr>
<tr>
<td>MATH 103</td>
<td>3</td>
</tr>
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</table>

Essential Studies: Fine Arts/Humanities

<table>
<thead>
<tr>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>3</td>
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Spring

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>ENGL 130</td>
<td>3</td>
</tr>
<tr>
<td>ECON 201</td>
<td>3</td>
</tr>
<tr>
<td>ECON 210</td>
<td>3</td>
</tr>
<tr>
<td>ISBC 217</td>
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Electives

<table>
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<tr>
<th>Credits</th>
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<tbody>
<tr>
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Sophomore Year

Fall

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<tbody>
<tr>
<td>ACCT 200</td>
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<tr>
<td>ECON 202</td>
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<td>ISBC 217</td>
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Electives

<table>
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<tr>
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<tr>
<td>15</td>
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Total Credits

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<tr>
<th>Credits</th>
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<tbody>
<tr>
<td>120</td>
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1 = Marketing Research, Consumer Behavior, or International Marketing.
### Political Science

#### B.A. with Major in Political Science

<table>
<thead>
<tr>
<th>Freshman Year</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Semester</strong></td>
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</tr>
<tr>
<td>ENGL 110</td>
<td>3</td>
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<tr>
<td>MATH 103</td>
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</tr>
<tr>
<td>POLS 115</td>
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</tr>
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<td>POLS 120</td>
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<tr>
<td>Language 102</td>
<td>4</td>
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<tr>
<td>Essential Studies: Fine Arts</td>
<td>3</td>
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<tr>
<td>Essential Studies: Fine Arts or Humanities</td>
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<td><strong>Total Credits</strong></td>
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#### Sophomore Year

<table>
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<tr>
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<tbody>
<tr>
<td>POLS 225</td>
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<tr>
<td>ECON 201</td>
<td>3</td>
</tr>
<tr>
<td>ECON 210</td>
<td>3</td>
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<tr>
<td>Essential Studies: Humanities Recommended: PHIL 110</td>
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<tr>
<td><strong>Total Credits</strong></td>
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<table>
<thead>
<tr>
<th>Second Semester</th>
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<tbody>
<tr>
<td>POLS 441</td>
<td>6</td>
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<tr>
<td>POLS 452</td>
<td>3</td>
</tr>
<tr>
<td>Essential Studies: Lab Science</td>
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<tr>
<td><strong>Total Credits</strong></td>
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#### Junior Year

<table>
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</thead>
<tbody>
<tr>
<td>POLS 300</td>
<td>3</td>
</tr>
<tr>
<td>POLS 310</td>
<td>3</td>
</tr>
<tr>
<td>POLS 405</td>
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<td><strong>Total Credits</strong></td>
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<table>
<thead>
<tr>
<th>Second Semester</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>POLS Electives</td>
<td>6</td>
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<tr>
<td><strong>Total Credits</strong></td>
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<table>
<thead>
<tr>
<th>Senior Year</th>
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</thead>
<tbody>
<tr>
<td>POLS 432</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
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### Public Affairs

#### B.S. with Major in Public Affairs

<table>
<thead>
<tr>
<th>Freshman Year</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Semester</strong></td>
<td></td>
</tr>
<tr>
<td>ENGL 110</td>
<td>3</td>
</tr>
<tr>
<td>MATH 103</td>
<td>3</td>
</tr>
</tbody>
</table>

---

Students must complete enough electives to bring total credit hours up to the 120. Every student must fulfill all University, College, Departmental, and Essential Studies requirements. Special Emphasis courses can fulfill an essential studies requirement as well as the Humanities breadth of knowledge requirement. Careful planning may facilitate the completion of a second major or a minor in addition to this major -- within or close to 4 years of study!
POLS 115  American Government I  3
or POLS 116  or State and Local Government  3
POLS 120  Global Perspectives  4
Essential Studies: Lab Science  4
Credit  16

Second Semester
COMM 110  Fundamentals of Public Speaking  3
ENGL 130  Composition II: Writing for Public Audiences  3
Essential Studies: Humanities  6
Essential Studies: Social Science  3
Credit  15

Sophomore Year
First Semester
POLS 200  Introduction to the Nonprofit Sector  3
or POLS 250  or Introduction to Public Administration  3
AGCT 200  Elements of Accounting I  3
ECON 201  Principles of Microeconomics  3
POLS 215  Politics and Diversity  3
Essential Studies: Fine Arts or Humanities  3
Credit  15

Second Semester
POLS 361  Nonprofit Management (Undergrad)  3
or ECON 210  or Introduction to Business and Economic Statistics  3
Free Electives  12
Credit  15

Junior Year
First Semester
POLS 480  Administrative Internship  3
or POLS 300  or Introduction to Research Methods  3
MGMT 300  Principles of Management  3
Nonprofit or Pub Adm Elective  3
Free Electives  6
Credit  15

Second Semester
POLS 437  Administrative Processes  3
Nonprofit or Pub Adm Elective  3
Free Electives  9
Credit  15

Senior Year
First Semester
Free Electives  15
Credit  15

Second Semester
POLS 495  Senior Colloquium in Political Science and Public Administration  3
Free Electives  11
Credit  14

Total Credits  120

The BS in Public Affairs (new name beginning in Fall 2018) allows students to follow a core set of courses that provide a foundation of knowledge in nonprofit or public administration. Students select to either pursue the nonprofit track or public administration track to complement the core coursework. Students pursuing the nonprofit track should consider also pursuing a minor in Nonprofit Leadership. Students pursuing the public administration track should consider extending their course of study for one year to earn a Master in Public Administration degree (4+1 combined program).

Students must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://umd.edu/academics/essential-studies)

College of Education & Human Development

B.S. ED. with a Major in Early Childhood Education (p. 280)
B.S. ED. with a Major in Elementary Education (p. 281)
B.S. in Kinesiology (p. 282)
B.S. ED. with a Major in Middle Level Education (p. 284)
B.S. in Rehabilitation and Human Services (p. 285)
B.S. ED. with a Major in Science Education (p. 285)
B.S. ED. with a Major in Social Studies Education (p. 286)

Early Childhood Education

B.S.ED. with a Major in Early Childhood Education

Freshman Year
First Semester
ENGL 110  College Composition I  3
T&L 252  Child Development  3
FA 150  or THEA 110  Introduction to the Fine Arts  3
Credit  18-19

Second Semester
ENGL 130  Composition II: Writing for Public Audiences  3
Essential Studies: Social Science  3
Essential Studies: Arts & Humanities (Fine Arts)  3
Essential Studies: Math/Sci/Tech  3
Credit  18-19

Sophomore Year
First Semester
T&L 250  Introduction to Education  3
T&L 310  Language Development and Emerging Literacy  3
Essential Studies: Social Science  3
Essential Studies: Math/Sci/Tech  3
Credit  12-13

Second Semester
T&L 302  Infant and Toddler  3
T&L 336  Social and Emotional Development and Guidance of Children  3
T&L 328  Survey of Children's Literature  3
T&L 335  Understanding Readers and Writers  3
T&L 322  Administration and Leadership in Early Childhood Education  3
T&L 453  Methods and Materials: Kindergarten  2
Credit  17
### Elementary Education

#### B.S. ED. with a Major in Elementary Education

**Freshman Year**

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ENGL 110</strong></td>
<td>3</td>
</tr>
<tr>
<td><strong>GEOG 151</strong></td>
<td>3</td>
</tr>
<tr>
<td>or <strong>GEOG 161</strong></td>
<td>3</td>
</tr>
<tr>
<td><strong>Science 1</strong></td>
<td>2-4</td>
</tr>
<tr>
<td><strong>FA 150</strong></td>
<td>3</td>
</tr>
<tr>
<td>or <strong>THEA 110</strong></td>
<td>3</td>
</tr>
<tr>
<td><strong>HIST 101</strong></td>
<td>3</td>
</tr>
<tr>
<td>or <strong>HIST 102</strong></td>
<td>3</td>
</tr>
<tr>
<td>or <strong>HIST 103</strong></td>
<td>3</td>
</tr>
<tr>
<td>or <strong>HIST 104</strong></td>
<td>3</td>
</tr>
<tr>
<td>or <strong>HIST 105</strong></td>
<td>3</td>
</tr>
<tr>
<td>or <strong>HIST 106</strong></td>
<td>3</td>
</tr>
<tr>
<td>or <strong>HIST 220</strong></td>
<td>3</td>
</tr>
</tbody>
</table>

---

**Second Semester**

| Credits | 14-16 |

---

**Sophomore Year**

**First Semester**

| T&L 315 | 3 |
| **Science 1** | 2-4 |
| **Minor or Specialty Area 3** | 6 |

**Credits**

| 14-16 |

---

**Second Semester**

| T&L 328 | 3 |
| or **T&L 329** | 3 |
| **T&L 335** | 3 |
| **T&L 339** | 3 |
| **MATH 277** | 3 |
| **MUSC 442** or **MUSC 443** | 3 |

**Minor or Specialty Area 3**

| 3 |

---

**Junior Year**

**First Semester**

| T&L 432 | 3 |
| **Science 1** | 3-4 |
| **ART 460** | 3 |
| **KIN 305** | 3 |

**Credits**

| 17-19 |

---

**Second Semester**

| T&L 417 | 2 |
| **T&L 433** | 3 |
| **Science 1** | 3-4 |
| **Minor or Specialty Area 4** | 6 |

**Credits**

| 14-15 |

---

**Senior Year**

**First Semester**

| T&L 410 | 3 |
| **T&L 430** | 3 |
| **T&L 440** | 3 |
| **T&L 470** | 3 |
| **T&L 486** | 2 |

**Credits**

| 14 |

---

**Second Semester**

| T&L 487 | 13 |
| **T&L 488** | 1 |
| **T&L 489** | 3 |

**Credits**

| 14 |

---

1 = To obtain a teaching license in North Dakota, coursework must be completed in life, physical, earth, and space sciences, two of which must have a corresponding lab. See academic advisor for a complete list of course options. 2 = 3 additional social science credits are required. 3 = 3 additional credits of humanities are required. 4 = A 20 unit Minor or Specialty Area is required. See your academic advisor for additional information.
Students must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)

**Kinesiology**

**B.S. in Kinesiology: Option A-Teacher Education/Certification** (p. 282)

**B.S. in Kinesiology: Option B-Related Areas or Option D-Allied Health** (p. 282)

**B.S. in Kinesiology: Option C**

**B.S. in Public Health Education (B.S.P.H.E.)** (p. 284)

**B.S. in Kinesiology: Option A-Teacher Education/Certification**

**Freshman Year**

**Fall**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHE 101</td>
<td>Introduction to Public Health</td>
<td>3</td>
</tr>
<tr>
<td>KIN 240</td>
<td>Introduction to Wellness</td>
<td>2</td>
</tr>
<tr>
<td>KIN 242</td>
<td>Introduction to Kinesiology</td>
<td>2</td>
</tr>
<tr>
<td>ENGL 110</td>
<td>College Composition I</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 150</td>
<td>General Biology I</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 150L</td>
<td>General Biology Laboratory</td>
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Essential Studies A&H: 3

**Credits**: 17

**Spring**

<table>
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<tr>
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<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHE 102</td>
<td>Epidemiology in Public Health</td>
<td>3</td>
</tr>
<tr>
<td>MATH 103</td>
<td>College Algebra</td>
<td>3</td>
</tr>
<tr>
<td>COMM 110</td>
<td>Fundamentals of Public Speaking</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 130</td>
<td>Composition II: Writing for Public Audiences</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 252</td>
<td>Child Development</td>
<td>3</td>
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Essential Studies A&H: 3

**Credits**: 18

**Sophomore Year**

**Fall**

<table>
<thead>
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<th>Course Title</th>
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<tbody>
<tr>
<td>ANAT 204</td>
<td>Anatomy for Paramedical Personnel</td>
<td>3</td>
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<tr>
<td>ANAT 204L</td>
<td>Anatomy for Paramedical Personnel Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>KIN 207</td>
<td>Prevention, Care and Legal Issues for Injury</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 250</td>
<td>Introduction to Education</td>
<td>3</td>
</tr>
<tr>
<td>KIN 305</td>
<td>Health/Physical Education for Early Childhood and Elementary Education Teachers</td>
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Essential Studies M.S&T: 3

Essential Studies A&H: 3

Application into Teacher education: 3

**Credits**: 20

**Spring**

<table>
<thead>
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<th>Course Title</th>
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<td>KIN 111</td>
<td>Individual Sports/Activities I</td>
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</tr>
<tr>
<td>KIN 112</td>
<td>Outdoor Pursuits I</td>
<td>1</td>
</tr>
<tr>
<td>KIN 116</td>
<td>Team Sports I</td>
<td>1</td>
</tr>
<tr>
<td>KIN 231</td>
<td>Individual Sports/Activities: Movement Performance and Analysis (MP&amp;A)</td>
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<tr>
<td>KIN 232</td>
<td>Outdoor Pursuits: Movement Performance and Analysis (MP&amp;A)</td>
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<tr>
<td>KIN 236</td>
<td>Team Sports: Movement Performance and Analysis (MP&amp;A)</td>
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<tr>
<td>KIN 276</td>
<td>Motor Learning</td>
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<tr>
<td>KIN 276L</td>
<td>Motor Learning Lab</td>
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<tr>
<td>PPT 301</td>
<td>Human Physiology</td>
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**Credits**: 19

**Junior Year**

**Fall**

<table>
<thead>
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<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>KIN 402</td>
<td>Exercise Physiology</td>
<td>3</td>
</tr>
<tr>
<td>KIN 402L</td>
<td>Exercise Physiology Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>KIN 332</td>
<td>Biomechanics</td>
<td>3</td>
</tr>
<tr>
<td>KIN 332L</td>
<td>Biomechanics Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>KIN 440</td>
<td>Sport Psychology</td>
<td>3</td>
</tr>
<tr>
<td>KIN 355</td>
<td>Applied Motor Development</td>
<td>3</td>
</tr>
<tr>
<td>KIN 224</td>
<td>Aquatics: Movement Performance and Analysis (MP&amp;A)</td>
<td>1</td>
</tr>
<tr>
<td>KIN 104</td>
<td>Aquatics I</td>
<td>1</td>
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**Credits**: 16

**Spring**

<table>
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<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>KIN 446</td>
<td>Exercise Testing and Prescription</td>
<td>3</td>
</tr>
<tr>
<td>KIN 401</td>
<td>Sport Sociology</td>
<td>3</td>
</tr>
<tr>
<td>KIN 404</td>
<td>Adapted Physical Activity</td>
<td>3</td>
</tr>
<tr>
<td>PHE 306</td>
<td>Epidemiology and Biostatistics</td>
<td>3</td>
</tr>
<tr>
<td>KIN 420</td>
<td>Curriculum Development for Physical and Health Education</td>
<td>3</td>
</tr>
<tr>
<td>KIN 400L</td>
<td>Methods and Materials for Teaching Physical Education in the Elementary School-Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>KIN 400</td>
<td>Methods and Materials for Teaching Physical Education Elementary School</td>
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**Credits**: 19

**Senior Year**

**Fall**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>T&amp;L 339</td>
<td>Educational Technology</td>
<td>2</td>
</tr>
<tr>
<td>T&amp;L 433</td>
<td>Multicultural Education</td>
<td>3</td>
</tr>
<tr>
<td>KIN 491</td>
<td>Senior Capstone</td>
<td>3</td>
</tr>
<tr>
<td>KIN 410</td>
<td>Methods and Materials for Teaching Physical and Health Education in the Secondary School</td>
<td>3</td>
</tr>
<tr>
<td>KIN 410L</td>
<td>Methods and Materials for Teaching Physical &amp; Health Education in the Secondary School-Laboratory</td>
<td>1</td>
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<tr>
<td>KIN 131</td>
<td>Individual Sports/Activities II</td>
<td>1</td>
</tr>
<tr>
<td>KIN 136</td>
<td>Team Sports II</td>
<td>1</td>
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<tr>
<td>KIN 231</td>
<td>MP&amp;A Individual Sports</td>
<td>1</td>
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<tr>
<td>KIN 236</td>
<td>MP&amp;A Team Sports</td>
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<tr>
<td>T&amp;L 488</td>
<td>Senior Seminar</td>
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**Credits**: 17

**Spring**

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<tr>
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<tbody>
<tr>
<td>T&amp;L 487</td>
<td>Student Teaching</td>
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**Credits**: 16

**Total Credits**: 142

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**B.S. in Kinesiology: Option B-Related Areas or Option D-Allied Health**

**Freshman Year**

**Fall**

<table>
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<tr>
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<tbody>
<tr>
<td>ENGL 110</td>
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Essential Studies A&H: 3

**Credits**: 3

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<tbody>
<tr>
<td>KIN 240</td>
<td>Introduction to Wellness</td>
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**Credits**: 2

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<td>PHE 305</td>
<td>Research Methods in Kinesiology &amp; Public Health Education</td>
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<tr>
<td>KIN 326</td>
<td>Fundamentals of Physical Conditioning</td>
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**Credits**: 19

**Junior Year**

**Fall**

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<tbody>
<tr>
<td>KIN 402</td>
<td>Exercise Physiology</td>
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<td>KIN 402L</td>
<td>Exercise Physiology Laboratory</td>
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<tr>
<td>KIN 332</td>
<td>Biomechanics</td>
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<tr>
<td>KIN 332L</td>
<td>Biomechanics Laboratory</td>
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<tr>
<td>KIN 440</td>
<td>Sport Psychology</td>
<td>3</td>
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<td>KIN 355</td>
<td>Applied Motor Development</td>
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<tr>
<td>KIN 224</td>
<td>Aquatics: Movement Performance and Analysis (MP&amp;A)</td>
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<td>KIN 104</td>
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<td>KIN 401</td>
<td>Sport Sociology</td>
<td>3</td>
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<td>KIN 404</td>
<td>Adapted Physical Activity</td>
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<td>PHE 306</td>
<td>Epidemiology and Biostatistics</td>
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<td>KIN 420</td>
<td>Curriculum Development for Physical and Health Education</td>
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<td>KIN 400L</td>
<td>Methods and Materials for Teaching Physical Education in the Elementary School-Laboratory</td>
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**Credits**: 19

**Senior Year**

**Fall**

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<td>T&amp;L 433</td>
<td>Multicultural Education</td>
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<td>KIN 491</td>
<td>Senior Capstone</td>
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<tr>
<td>KIN 410</td>
<td>Methods and Materials for Teaching Physical and Health Education in the Secondary School</td>
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<td>KIN 410L</td>
<td>Methods and Materials for Teaching Physical &amp; Health Education in the Secondary School-Laboratory</td>
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<td>KIN 131</td>
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<td>KIN 136</td>
<td>Team Sports II</td>
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<td>MP&amp;A Individual Sports</td>
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<td>KIN 236</td>
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<tr>
<td>T&amp;L 488</td>
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**Credits**: 17

**Spring**

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<tbody>
<tr>
<td>T&amp;L 487</td>
<td>Student Teaching</td>
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</tbody>
</table>

**Credits**: 16

**Total Credits**: 142

Students must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)
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<td>KIN 242</td>
<td>Introduction to Kinesiology</td>
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<td>PHE 101</td>
<td>Introduction to Public Health</td>
<td>3</td>
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<tr>
<td>BIOL 150</td>
<td>General Biology I</td>
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<td>BIOL 150L</td>
<td>General Biology I Laboratory</td>
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<tr>
<td><strong>Spring</strong></td>
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<tr>
<td>PHE 102</td>
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<td>MATH 103</td>
<td>College Algebra</td>
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<td>COMM 110</td>
<td>Fundamentals of Public Speaking</td>
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<td>ENGL 130</td>
<td>Composition II: Writing for Public Audiences</td>
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<td>Essential Studies SS</td>
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<tr>
<td>ANAT 204</td>
<td>Anatomy for Paramedical Personnel</td>
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<td>ANAT 204L</td>
<td>Anatomy for Paramedical Personnel Laboratory</td>
<td>2</td>
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<tr>
<td>KIN 207</td>
<td>Prevention, Care and Legal Issues for Injury</td>
<td>3</td>
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<td>PPT 301</td>
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<td><strong>Junior Year</strong></td>
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<td>KIN 332</td>
<td>Biomechanics</td>
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<td>Biomechanics Laboratory</td>
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<td>KIN 355</td>
<td>Applied Motor Development</td>
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<td>KIN 402</td>
<td>Exercise Physiology</td>
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<td>KIN 402L</td>
<td>Exercise Physiology Laboratory</td>
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<td>KIN 440</td>
<td>Sport Psychology</td>
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<tr>
<td>PHE 306</td>
<td>Epidemiology and Biostatistics</td>
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<td>KIN 401</td>
<td>Sport Sociology</td>
<td>3</td>
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<td>KIN 404</td>
<td>Adapted Physical Activity</td>
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<td>KIN 446</td>
<td>Exercise Testing and Prescription</td>
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<td>Related Area/Pre-Allied Health Requirement</td>
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<td><strong>Credits</strong></td>
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<td><strong>Total Credits</strong></td>
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</table>

Pre-Allied Health Students should also meet with a Pre-Allied health program adviser for selection of Pre-Allied health courses.

Students must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)

---

### B.S. in Kinesiology: Option C

#### Freshman Year

##### Fall
- PHE 101 Introduction to Public Health 3
- ENGL 110 College Composition I 3
- BIOL 150 General Biology I 3
- KIN 240 Introduction to Wellness 2
- KIN 242 Introduction to Kinesiology 2
- BIOL 150L General Biology I Laboratory 1
- Essential Studies A&H 3
- Essential Studies SS 3
- **Credits** 18

##### Spring
- ENGL 130 Composition II: Writing for Public Audiences 3
- COMM 110 Fundamentals of Public Speaking 3
- PHE 102 Epidemiology in Public Health 3
- MATH 103 College Algebra 3
- Essential Studies A&H 3
- Essential Studies SS 3
- **Credits** 18

#### Sophomore Year

##### Fall
- ANAT 204 Anatomy for Paramedical Personnel 3
- ANAT 204L Anatomy for Paramedical Personnel Laboratory 2
- KIN 207 Prevention, Care and Legal Issues for Injury 3
- Related Area/Pre-Allied Health Requirement 3
- Essential Studies A&H 3
- Essential Studies MST 3
- **Credits** 17

##### Spring
- PPT 301 Human Physiology 4
- Essential Studies M,S&T/Related Areas/ Pre-Allied Health Requirement 3
- **Credits** 16

#### Junior Year

##### Fall
- KIN 332 Biomechanics 3
- KIN 332L Biomechanics Laboratory 1
- KIN 355 Applied Motor Development 3
- KIN 402 Exercise Physiology 3
- KIN 402L Exercise Physiology Laboratory 1
- KIN 440 Sport Psychology 3
- **Credits** 14

##### Spring
- PHE 306 Epidemiology and Biostatistics 3
- KIN 401 Sport Sociology 3
- KIN 404 Adapted Physical Activity 3
- KIN 446 Exercise Testing and Prescription 3
- Related Area/Pre-Allied Health Requirement 3
- **Credits** 13

#### Senior Year

##### Fall
- Electives 4
- KIN 497 Internship 5
- **Credits** 12

---

University of North Dakota

283

Pre-Allied Health Students should also meet with a Pre-Allied health program adviser for selection of Pre-Allied health courses.

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B.S. in Public Health Education (B.S.P.H.E.)

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<tr>
<td>Fall</td>
<td>ENGL 110 College Composition I 3</td>
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<tr>
<td></td>
<td>PHE 101 Introduction to Public Health 3</td>
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<td></td>
<td>PHE 103 Introduction to Global Health 3</td>
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<td>Essential Studies 6</td>
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<td>Spring</td>
<td>PHE 102 Epidemiology in Public Health 3</td>
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<td>ENGL 130 Composition II: Writing for Public Audiences 3</td>
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<td>COMM 110 Fundamentals of Public Speaking 3</td>
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<td>N&amp;D 240 Fundamentals of Nutrition 3</td>
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<td>Sophomore Year</td>
<td>Credits 15</td>
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<tr>
<td>Fall</td>
<td>KIN 110 First Aid and CPR 1</td>
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B.S. ED. with a Major in Middle Level Education

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<tr>
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<td>Social Science 1 3</td>
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<td>Math/Science/Technology 2 3-4</td>
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<td>Credits 12-13</td>
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<td>Second Semester</td>
<td>COMM 110 Fundamentals of Public Speaking 3</td>
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<td>ENGL 130 Composition II: Writing for Public Audiences 3</td>
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<td>Arts &amp; Humanities (FA OR HUM) 3</td>
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<td>Social Science 1 3</td>
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<td>Math/Science/Technology 2 3-4</td>
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<td>First Semester</td>
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<td>T&amp;L 315 or Integrating Diverse Needs in Educational Settings 3</td>
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<tr>
<td>First Semester</td>
<td>T&amp;L 341 Foundations of Middle Level Education 2</td>
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<td>T&amp;L 350 Development and Education of the Adolescent 3</td>
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<td>T&amp;L 409 Reading in the Content Areas 3</td>
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<td>T&amp;L 432 Learning Environments 3</td>
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<td>T&amp;L 433 Multicultural Education 3</td>
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<td>T&amp;L 465 Middle Level Curriculum and Methods 5</td>
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Rehabilitation & Human Services

B.S. in Rehabilitation and Human Services

Freshman Year
First Semester
ENGL 110 College Composition I 3
PSYC 111 Introduction to Psychology 3
ES Elective Please visit with advisor for specific course recommendations. 3
ES Elective Please visit with advisor for specific course recommendations. 3
ES Elective Please visit with advisor for specific course recommendations. 3
ES Elective Please visit with advisor for specific course recommendations. 3

Credits 17
Second Semester
ENGL 130 Composition II: Writing for Public Audiences 3
SOC 110 Introduction to Sociology 3
COUN 250 Dialogue on U.S. Diversity 3
ES Elective Please visit with advisor for specific course recommendations. 3
ES Elective Please visit with advisor for specific course recommendations. 3

Credits 15

Sophomore Year
First Semester
RHS 200 Helping Skills in Community Services 3
PSYC 250 Developmental Psychology 4
ES Elective Please visit with advisor for specific course recommendations. 3
ES Elective Please visit with advisor for specific course recommendations. 3
ES Elective Please visit with advisor for specific course recommendations. 3

Credits 16
Second Semester
RHS 250 Contemporary Issues in Rehabilitation 3
PSYC 270 Abnormal Psychology 3
ES Elective Please visit with advisor for specific course recommendations. 3
ES Elective Please visit with advisor for specific course recommendations. 3
ES Elective Please visit with advisor for specific course recommendations. 3

Credits 15

Senior Year
First Semester
RHS 339 Educational Technology 2
Academic Concentration Courses 3
Elective 1

Credits 15
Second Semester
T&L 487 Student Teaching 13
T&L 488 Senior Seminar 1
T&L 489 Senior Capstone: Responsive Teaching 3

Credits 17

Junior Year
First Semester
RHS 350 Overview of Disabilities 3
PSYC 241 Introduction to Statistics (Or Soc 326) 4
SOC 361 Social Psychology (Or Psy 361) 3
General Elective Please visit with advisor for specific course recommendations. 3
RHS Elective Please visit with advisor for specific course recommendations. 3

Credits 15
Second Semester
RHS 450 Vocational Assessment and Job Acquisition 3
PSYC 303 Research Methods in Psychology (Or Soc 323.) 3
General Elective Please visit with advisor for specific course recommendations. 3
RHS Elective Please visit with advisor for specific course recommendations. 3
RHS Elective Please visit with advisor for specific course recommendations. 3

Credits 15

Senior Year
First Semester
RHS 455 Rehabilitation Process 3
PSYC 360 Introduction to Personality 3
General Elective Please visit with advisor for specific course recommendations. 3
RHS Elective Please visit with advisor for specific course recommendations. 3
RHS Elective Please visit with advisor for specific course recommendations. 3

Credits 15
Second Semester
RHS 493 Senior Capstone Seminar 3
RHS 497 Internship in Rehabilitation 493 and 497 may be taken in summer of junior year 9

Credits 12
Total Credits 121

ES = Essential Studies.

Students must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)

Science Education

B.S. ED. with a Major in Science Education

Freshman Year
First Semester
ENGL 110 College Composition I 3
Social Science 3
Arts & Humanities (Fine Arts) 3
Science Course Area 1 3-4
Science Course Area 2 3-4

Credits 15-17
Second Semester
ENGL 130 Composition II: Writing for Public Audiences 3
COMM 110 Fundamentals of Public Speaking 3
Social Science 3
Arts & Humanities (HUM) 3
Science Course Area 1 3-4
Science Course Area 2 3-4

Credits 18-20

Sophomore Year
First Semester
T&L 250 Introduction to Education 3
T&L 319 Integrating Diverse Needs in Educational Settings 3
Social Science 3

Credits 9
Second Semester
T&L 339 Educational Technology 2
Academic Concentration Courses 3
Elective 1

Credits 15
Second Semester
RHS 450 Vocational Assessment and Job Acquisition 3
PSYC 303 Research Methods in Psychology (Or Soc 323.) 3
General Elective Please visit with advisor for specific course recommendations. 3
RHS Elective Please visit with advisor for specific course recommendations. 3
RHS Elective Please visit with advisor for specific course recommendations. 3

Credits 15

Senior Year
First Semester
RHS 455 Rehabilitation Process 3
PSYC 360 Introduction to Personality 3
General Elective Please visit with advisor for specific course recommendations. 3
RHS Elective Please visit with advisor for specific course recommendations. 3
RHS Elective Please visit with advisor for specific course recommendations. 3

Credits 15
Second Semester
RHS 493 Senior Capstone Seminar 3
RHS 497 Internship in Rehabilitation 493 and 497 may be taken in summer of junior year 9

Credits 12
Total Credits 121

ES = Essential Studies.

Students must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)
Social Studies Education

B.S. ED. with a Major in Social Studies Education

Freshman Year

First Semester

<table>
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<tr>
<th>Course</th>
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<tbody>
<tr>
<td>ENGL 110 College Composition I</td>
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<tr>
<td>Science/Technology with Lab 1</td>
<td>3-4</td>
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<tr>
<td>GEOG 161 World Regional Geography</td>
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Second Semester

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<tbody>
<tr>
<td>T&amp;L 339 Educational Technology</td>
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<td>MATH 165 Calculus I</td>
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<td>Science Course Area 1 1</td>
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<td>Science Course Area 3 4</td>
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Credits 18-20

Junior Year

First Semester

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<th>Course</th>
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<tbody>
<tr>
<td>T&amp;L 345 Curriculum, Instruction, and Assessment</td>
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<tr>
<td>T&amp;L 350 Development and Education of the Adolescent</td>
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<td>Science Course Area 1 2</td>
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<tr>
<td>Science Course Area 3 4</td>
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Credits 14

Second Semester

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<tr>
<td>T&amp;L 432 Learning Environments</td>
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<tr>
<td>MATH 321 or PSYC 241 or ECON 210</td>
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Science Course Area 1 2                      | 3-4     |
| Science Course Area 3 4                    | 3-4     |

Credits 12-14

Senior Year

First Semester

<table>
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<tbody>
<tr>
<td>T&amp;L 400 Methods and Materials</td>
<td>3</td>
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<tr>
<td>T&amp;L 401 Safety Science</td>
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<tr>
<td>T&amp;L 486 Field Experience</td>
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<tr>
<td>T&amp;L 433 Multicultural Education</td>
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<td>Science Course Area 4 5</td>
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Credits 13

Second Semester

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<tr>
<td>T&amp;L 487 Student Teaching</td>
<td>13</td>
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<tr>
<td>T&amp;L 488 Senior Seminar</td>
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<tr>
<td>T&amp;L 489 Senior Capstone: Responsive Teaching</td>
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Credits 17

Total Credits 121-129

1 = Social Science - 9 credits, minimum of two departments. 2 = Minimum of 24 credits in ONE of the following areas: biology, chemistry, physics, or earth science. 3 = Minimum of 12 credits in science area not chosen in Area 1: biology, chemistry, physics or earth science. 4 = Minimum of 12 credits in science area not chosen as Area 1 or 2: biology, chemistry, physics or earth science. 5 = Minimum of 4 credits in science area not chosen as Areas 1, 2 or 3: biology, chemistry, physics or earth science.

Students must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)
### T&L 489
- **Senior Capstone: Responsive Teaching** 3
  
#### Credits 17
  
**Total Credits** 120-121

1 = 9 credits; minimum 2 departments, must include a 4-hour science course with lab. 2 = 6 credits in one of the following areas Psychology, Sociology, Anthropology. PSYC 111 & 360; SOC 110 & 306 or 335 or 340 or 361; ANTH 100 or 171 or 172 or 200 & ANTH Elective, 300 or higher.

2= Students must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. ([https://und.edu/academics/essential-studies](https://und.edu/academics/essential-studies))

### College of Engineering & Mines

#### B.S. in Chemical Engineering (p. 287)

#### B.S. in Civil Engineering (p. 287)

#### B.A. in Computer Science

#### B.S. in Geology (p. 292)

#### B.S. in Mechanical Engineering (p. 292)

#### B.S. in Petroleum Engineering (p. 293)

### Chemical Engineering

#### B.S. in Chemical Engineering

**Freshman Year**

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Fall</td>
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<tr>
<td>CHEM 221 &amp; 221L</td>
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<tr>
<td>ENGL 110 College Composition I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 165 Calculus I</td>
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<td>Essential Studies: Arts &amp; Humanities</td>
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<tr>
<td>Essential Studies: Social Science</td>
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<tbody>
<tr>
<td>Spring</td>
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<tr>
<td>CHE 102 Introduction to Chemical Engineering</td>
<td>2</td>
</tr>
<tr>
<td>CHEM 254 &amp; 254L Inorganic Chemistry I and Inorganic Chemistry I Laboratory</td>
<td>4</td>
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<tr>
<td>MATH 166 Calculus II</td>
<td>4</td>
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<tr>
<td>PHYS 251 University Physics I</td>
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<tr>
<td>Essential Studies: Arts &amp; Humanities</td>
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<td>Sophomore Year</td>
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<tr>
<td>Fall</td>
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<tr>
<td>CHE 201 Chemical Engineering Fundamentals</td>
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<tr>
<td>ENGL 130 Composition II: Writing for Public Audiences</td>
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<tr>
<td>LEAD 101 Learning Leadership</td>
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<tr>
<td>MATH 265 Calculus III</td>
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<tr>
<td>PHYS 252 University Physics II</td>
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<tbody>
<tr>
<td>Spring</td>
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<tr>
<td>CHE 206 Unit Operations in Chemical Engineering</td>
<td>3</td>
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<tr>
<td>CHE 232 Chemical Engineering Laboratory I</td>
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<tr>
<td>CHE 315 Engineering Statistics and Design of Experiments</td>
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| Credits | 120-121 |

#### Credits 16

**Junior Year**

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<tr>
<td>Fall</td>
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<tr>
<td>CHE 301 Introduction to Transport Phenomena</td>
<td>4</td>
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<tr>
<td>CHE 303 Chemical Engineering Thermodynamics</td>
<td>4</td>
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<tr>
<td>CHE 331 Chemical Engineering Laboratory II</td>
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<tr>
<td>ENGR 206 Fundamentals of Electrical Engineering</td>
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<tr>
<td>Technical Elective II</td>
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<tbody>
<tr>
<td>Spring</td>
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<tr>
<td>CHE 305 Separations</td>
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<tr>
<td>CHE 321 Chemical Engineering Reactor Design</td>
<td>3</td>
</tr>
<tr>
<td>CHE 332 Chemical Engineering Laboratory III</td>
<td>2</td>
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<tr>
<td>CHE 340</td>
<td>3</td>
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<tr>
<td>Material Science Elective</td>
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<td>Technical Elective I</td>
<td>3</td>
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<tr>
<td>Credits</td>
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<thead>
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<tbody>
<tr>
<td>Senior Year</td>
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<tr>
<td>Fall</td>
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<tr>
<td>CHE 408 Process Dynamics and Control</td>
<td>3</td>
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<tr>
<td>CHE 411 Plant Design I: Process Design and Economics</td>
<td>4</td>
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<tr>
<td>CHE 431 Chemical Engineering Laboratory IV</td>
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</table>
| CHEM 466 or CHE 403 Fundamentals of Physical and Biophysical Chemistry or Molecular Thermodynamics and Kinetics *3-4
| Advanced Chemical Science Elective | 3       |
| Credits            | 16-17   |

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<thead>
<tr>
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<tbody>
<tr>
<td>Spring</td>
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<tr>
<td>CHE 412 Plant Design II: Process Project Engineering</td>
<td>4</td>
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<tr>
<td>CHE 416 Chemical Product Design</td>
<td>3</td>
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<tr>
<td>Essential Studies: Arts &amp; Humanities</td>
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<tr>
<td>Advanced Chemical Science Elective</td>
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<td>Credits</td>
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**Total Credits** 130-131

1 CHEM 121/121L, may be taken in lieu of CHEM 221/221L and CHEM 122/122L may be taken in lieu of CHEM 254/254L. 2 CHE 235 and CHE 335 may be taken in lieu of the CHE 232, CHE 331, CHE 332 sequence. 3 CHEM 341/341L may be taken in lieu of CHEM 340/340L. 4 CHE 413/414 may be taken in lieu of CHE 412.

Students must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. ([https://und.edu/academics/essential-studies](https://und.edu/academics/essential-studies))

### Civil Engineering

#### B.S. in Civil Engineering

**Freshman Year**

<table>
<thead>
<tr>
<th></th>
<th>Credits</th>
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<tbody>
<tr>
<td>Fall</td>
<td></td>
</tr>
<tr>
<td>CE 101 Introduction to Civil Engineering</td>
<td>1</td>
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<tr>
<td>CHEM 121 General Chemistry I &amp; 121L General Chemistry I Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>ENGL 110 College Composition I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 165 Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>Essential Studies: Arts &amp; Humanities</td>
<td>3</td>
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<tr>
<td>Credits</td>
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</tbody>
</table>
Spring
CE 103 Graphical Communication 3
ENGL 130 Composition II: Writing for Public Audiences 3
ENGR 200 Computer Applications in Engineering 2
MATH 166 Calculus II 4
Essential Studies 3

Credits 15

Sophomore Year
Fall
CE 313 General Surveying 2
CE 313L General Surveying Laboratory 1
ENGR 201 Statics 3
GEOE 203 Earth Dynamics Lab optional 3
or GEOL 101 or Introduction to Geology 3
MATH 265 Calculus III 4
PHYS 251 University Physics I 4

Credits 17

Spring
ENGR 202 Dynamics 3
ENGR 203 Mechanics of Materials 3
MATH 266 Elementary Differential Equations 3
PHYS 252 University Physics II 4
or CHEM 122/122L or General Chemistry II 3
or BIOL 150/150L or General Biology I 3
MATH 321 or CHE 315 or ECON 210 or Engineering Statistics and Design of Experiments 3
or Introduction to Business and Economic Statistics 3

Credits 16

Junior Year
Fall
CE 301 Civil Engineering Laboratory I 2
CE 306 Fluid Mechanics 3
CE 351 Structural Mechanics 4
CE 412 Soil Mechanics 3
CHE 340 or ME 370 Engineering Disasters and Ethics 0-3

Credits 12-15

Spring
CE 302 Civil Engineering Laboratory II 2
or Essential Studies A category
CE 423 Hydraulic Engineering 3
CE 431 Environmental Engineering I 3
CE 451 Steel Design 3
Technical Elective 3
Essential Studies 3

Credits 17

Senior Year
Fall
CE 421 Hydrology 3
CE 432 Environmental Engineering II 3
CE 453 Reinforced Concrete 3
CE 482 Civil Engineering Design I 3
ENGR 460 Engineering Economy 3
Essential Studies 3

Credits 18

Spring
CE 414 Foundation Engineering 3
CE 416 Transportation Engineering 3
CE 444 Contracts and Specifications 3

CE 483 Civil Engineering Design II 3
Technical Elective 3

Credits 15

Total Credits 125-128

Chem 121 and 121L are required. PHYS 252, CHEM 122/122L, or BIOL 150/150 can be taken as a Basic Science Elective. GEOE 203 or GEOL 101 can be taken but it is recommended to take GEOE 203. MATH 321, CHE 315, or ECON 210 can be taken as a statistics course but take MATH 321 if you would like to get a minor in Math. Students can get a minor in Math if they take MATH 321 as a statistics course and MATH 421 as a technical elective without taking a single extra credit hour. CHE 340 or ME 370 can be taken as Ethics course that satisfies social science requirement. CE Technical Electives: CE Department and non-departmental courses specifically approved by CE Department and having direct application in civil engineering practice or Department scheduled CE 397 Cooperative Education experience. All CE graduate courses can be taken as technical elective. Other technical elective courses include: GEOG 474/474L, GEOE 417, MGMT 300, MGMT 395, etc.

Students must complete enough electives to bring total credit hours up to the 128. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)

Electrical Engineering

B.S. in Electrical Engineering
B.S. in Electrical Engineering with Aerospace Focus (p. 289)
B.S. in Electrical Engineering with Biomedical Focus (p. 290)
B.S. in Electrical Engineering with Computer Science Focus (p. 291)

B.S. in Electrical Engineering

Freshman Year

First Semester
CHEM 121 & 121L General Chemistry I and General Chemistry I Laboratory 4
EE 101 Introduction to Electrical Engineering 1
ENGL 110 College Composition I 3
MATH 165 Calculus I 4
Social Science Elective (SS) 2
Humanities Elective (A&H) 2

Credits 18

Second Semester
EE 201 Introduction to Digital Electronics 3
& 201L and Digital Electronics Laboratory 3
MATH 166 Calculus II 4
PHYS 251 University Physics I 4
Fine Arts Elective (A&H) 2
A&H or SS Elective 2

Credits 18

Sophomore Year

First Semester
EE 206 Circuit Analysis 4
& 206L and Circuits Laboratory I 4
EE 304 Computer Aided Measurement and Controls 3
ENGL 130 Composition II: Writing for Public Audiences 3
MATH 265 Calculus III 4
PHYS 252 University Physics II 4

Credits 18

Second Semester
EE 313 Linear Electric Circuits 4
& 313L and Circuits Laboratory II 4

Credits 18
ENGR 460 Engineering Economy  3
MATH 207 Introduction to Linear Algebra  2
MATH 266 Elementary Differential Equations  3
Non EE Elective  3

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<thead>
<tr>
<th>Junior Year</th>
<th>First Semester</th>
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<tbody>
<tr>
<td>EE 314</td>
<td>Signals and Systems  4</td>
</tr>
<tr>
<td>EE 316</td>
<td>Electric and Magnetic Fields  3</td>
</tr>
<tr>
<td>EE 318</td>
<td>Engineering Data Analysis  3</td>
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<tr>
<td>EE 321 &amp; 321L</td>
<td>Electronics I and Electronics Laboratory I  4</td>
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<tr>
<td>EE 401</td>
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<td>EE 405 &amp; 405L</td>
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<tr>
<td>EE 409</td>
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<tr>
<td>EE 421 &amp; 421L</td>
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<td>EE 452</td>
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<tr>
<td>EE 480</td>
<td>Senior Design I  3</td>
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<td>Electrical Engineering Elective  3</td>
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<tr>
<td>EE 481</td>
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<tr>
<td>Electrical Engineering Elective  3</td>
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<td>Electrical Engineering Elective  3</td>
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<tr>
<td>Ethics Elective (A&amp;H or SS)  2 6</td>
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| Total Credits | 125 |

1 – May be waived for transfer students (substitute science credit required).  2 – To meet the University’s Essential Studies Breadth of Knowledge requirements, all students must complete 9 credits of Arts & Humanities Electives (minimum of 2 departments, including 3 Fine Arts credits and 3 Humanities credits) and 9 credits of Social Sciences Electives (minimum of 2 departments). Refer to the online Academic Catalog for a listing of acceptable Essential Studies courses.
2 – Non-EE Elective choices: Engr 201, Engr 202, Engr 203, ME 301, ME/CE 306, and ME 341; Computer Science, Engineering (including EE), Math, and Physics courses approved by advisor, normally 300 level or higher. Math 308 and Math 321 do not meet the requirements of non-EE Elective. CSci 242, CSci 260, and Math 208 are permitted. 4 – EE 481 meets the Essential Studies Special Emphasis requirement for Oral Communication (O). 5 – Maximum of three credits of EE 490 allowed as an independent study, applicable to both EE and non-EE electives. 2 credits of EE 397 Cooperative Education (40 hours/week) is equivalent to 3 credits of the EE Electives with S/U grading, maximum 4 credits of EE 397 is equivalent to maximum of 6 credits of EE Elective.  6 – The Ethics Elective is a 3-credit course that meets Essential Studies requirements in either the Arts & Humanities or the Social Sciences. Ethics Elective choices: Phil 120 Introduction to Ethics (Humanities), CSci 340 (SS), and ME 370 (SS). Some of the following courses may be waived by completing: Introduction to Engineering: ENGR 102 EE 101 Introduction to Electrical Engineering 1 EE 201 Introduction to Digital Electronics 2 EE 201L Digital Electronics Laboratory 1 EE 304 Computer Aided Measurement and Controls 3 EE 397 Cooperative Education 1-2 up to 6 credit hours of non-EE electives III- Grade of “C” or better in all EE courses required for graduation.

Students must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. [https://und.edu/academics/essential-studies]

### B.S. in Electrical Engineering with Aerospace Focus

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<tr>
<th>Freshman Year</th>
<th>First Semester</th>
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<tbody>
<tr>
<td>CHEM 121 &amp; 121L</td>
<td>General Chemistry I and General Chemistry I Laboratory 4</td>
</tr>
<tr>
<td>EE 101</td>
<td>Introduction to Electrical Engineering 1</td>
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<tr>
<td>ENGL 110</td>
<td>College Composition I 3</td>
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<tr>
<td>MATH 165</td>
<td>Calculus I 4</td>
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<td>Social Sciences Elective (SS)  2</td>
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<tbody>
<tr>
<td>EE 201 &amp; 201L</td>
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<tr>
<td>EE 304</td>
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<tr>
<td>MATH 265</td>
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<td>PHYS 251</td>
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<tr>
<td>Fine Arts Elective (A&amp;H)  2</td>
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### Sophomore Year

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<td>EE 206 &amp; 206L</td>
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<tr>
<td>EE 304</td>
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<td>MATH 265</td>
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<td>PHYS 252</td>
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<td>AVIT 102</td>
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<td>EE 313 &amp; 313L</td>
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### Junior Year

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<td>EE 316</td>
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<td>EE 405 &amp; 405L</td>
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<td>EE 421 &amp; 421L</td>
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Senior Year

First Semester
EE 480 Senior Design I 5 3
Aviation Elective 7 3
Electrical Engineering Elective 6 3
Non-EE Elective 3 3
A&H or SS Elective 2 3
Credits 15

Second Semester
EE 481 Senior Design II 6 3
Aviation Elective 7 3
Electrical Engineering Elective 5 3
Ethics Elective (A&H or SS) 2, 6 3
Credits 12

Total Credits 128

III-Grade “C” or better in all EE courses required for graduation. 1-May be waived for transfer students (substitute science credit required). 2-To meet the University’s Essential Studies Breadth of Knowledge requirements, all students must complete 9 credits of Arts & Humanities Electives (minimum of 2 departments, including 3 Fine Arts credits and 3 Humanities credits) and 9 credits of Social Sciences Electives (minimum of 2 departments). Refer to the online Academic Catalog for a listing of acceptable Essential Studies courses. 3-Non-EE Elective choices: Engr 201, Engr 202, Engr 203, ME 301, ME/CE 306, and ME 341, Computer Science, Engineering (including EE), Math, and Physics courses approved by advisor, normally 300 level or higher. Math 308 and Math 321 do not meet non-EE elective requirements. CSci 242, CSci 260, and Math 208 are permitted. 4-EE 481 meets the Essential Studies Special Emphasis requirement for Oral Communication (O). 5-Minimum of three credits of EE 490 allowed as an independent study, applicable to both EE and non-EE Electives. 2 credits of EE 397 Cooperative Education (40 hours/week) is equivalent to 3 credits of the EE Electives with SUU grading, maximum 4 credits of EE 397 is equivalent to maximum of 6 credits of EE Elective. 6-The Ethics Elective is a 3-credit course that meets Essential Studies requirements in either the Arts & Humanities or the Social Sciences. Ethics Elective choices: Phil 120 (H, Humanities), Che 340 (SS), and ME 370 (SS). 7-Total of 6 credit hours of Aviation Electives: Recommended courses are: Avit 250–Human Factors, Avit 309–Flight Physiology, Avit 324–Aircraft Systems, Avit 325–Multi-engine Systems, Avit 327–Gas Turbine Engines, and Avit 428–Transport Category Aircraft Systems.

Students must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)

B.S. in Electrical Engineering with Biomedical Focus

Freshman Year
First Semester
BIOL 150 General Biology I 4
& 150L and General Biology I Laboratory 4
CHEM 121 General Chemistry I 4
& 121L and General Chemistry I Laboratory 4
EE 101 Introduction to Electrical Engineering 1 1
ENGL 110 College Composition I 3
MATH 165 Calculus I 3
Credits 16

Second Semester
BIOL 151 General Biology II 4
& 151L and General Biology II Laboratory 4
EE 201 Introduction to Digital Electronics 3
& 201L and Digital Electronics Laboratory 3
MATH 166 Calculus II 4

Sophomore Year
First Semester
EE 206 Circuit Analysis 4
& 206L and Circuits Laboratory I 4
EE 304 Computer Aided Measurement and Controls 3
ENGL 130 Composition II: Writing for Public Audiences 3
MATH 265 Calculus III 4
PHYS 252 University Physics II 4
Credits 18

Second Semester
ANAT 204 Anatomy for Paramedical Personnel 3
EE 313 Linear Electric Circuits 4
& 313L and Circuits Laboratory II 4
ENGR 460 Engineering Economy (SS) 2 3
MATH 266 Elementary Differential Equations 3
PSYC 111 Introduction to Psychology (SS) 2 3
or SOC 110 or Introduction to Sociology 3
Credits 16

Junior Year
First Semester
EE 314 Signals and Systems 4
& 314L and Signal and Systems Laboratory 4
EE 316 Electric and Magnetic Fields 3
EE 318 Engineering Data Analysis 3
EE 321 Electronics I 4
& 321L and Electronics Laboratory I 4
PPT 301 Human Physiology 4
Credits 18

Second Semester
EE 405 Control Systems I 4
& 405L and Control Systems Laboratory 4
EE 409 Distributed Networks 3
EE 421 Electronics II 4
& 421L and Electronics Lab II 4
EE 452 Embedded Systems 4
& 452L and Embedded Systems Design Laboratory 4
Credits 15

Senior Year
First Semester
EE 480 Senior Design I 4 3
Electrical Engineering Elective 6 3
Electrical Engineering Elective 6 3
Humanities Elective (A&H) 6 3
Fine Arts Elective (A&H) 2 3
Credits 15

Second Semester
EE 481 Senior Design II 5 3
Electrical Engineering Elective 6 3
Non-EE Elective 3 3
Ethics Elective (A&H or SS) 2 3
A&H or SS elective 2 3
Credits 15

Total Credits 128

III-Grade “C” or better in all EE courses required for graduation. 1-May be waived for transfer students (substitute science credit required). 2-To meet the University’s Essential Studies Breadth of Knowledge requirements, all students must complete 9 credits of Arts & Humanities Electives (minimum of 2 departments, including 3 Fine Arts credits and 3 Humanities credits) and 9 credits of Social Sciences Electives (minimum of 2 departments). Refer to the online Academic Catalog for a listing of acceptable Essential Studies courses. 3-Non-EE Elective choices: Engr 201, Engr 202, Engr 203, ME 301, ME/CE 306, and ME 341, Computer Science, Engineering (including EE), Math,
and Physics courses approved by advisor, normally 300 level or higher. Math 308 and Math 321 do not meet the non-EE elective requirement. CSci 242, CSci 260, and Math 208 are permitted. 4. EE 480 meets the Essential Studies Special Emphasis requirements for Advanced Communication (A) and Senior Capstone (C). EE 480 Prerequisites: EE 421 and EE 421L and two out of the four following classes: EE 401, EE 405, EE 409, EE 452. 5. EE 481 meets the Essential Studies Special Emphasis requirement for Oral Communication (O). 6. Maximum of three credits of EE 490 allowed as an independent study, applicable to both EE and Non-EE electives. Recommended EE elective: EE 550 Bioinstrumentation. 2 credits of EE 397 Cooperative Education (40 hours/week) is equivalent to 3 credits of the EE Electives with S/U grading, maximum 4 credits of EE 397 is equivalent to maximum of 6 credits of EE Elective.

Students must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)

**B.S. in Electrical Engineering with Computer Science Focus**

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<th>Credits</th>
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<td>CSCI 161</td>
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<tr>
<td>EE 201 &amp; 201L</td>
<td>Introduction to Digital Electronics and Digital Electronics Laboratory</td>
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<td>ENGL 130</td>
<td>Composition II: Writing for Public Audiences</td>
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<td>MATH 166</td>
<td>Calculus II</td>
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<tr>
<td>CHEM 121 &amp; 1211</td>
<td>General Chemistry I</td>
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<td>CSCI 130 or CSCI 160</td>
<td>Introduction to Scientific Programming or Computer Science I</td>
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<td>EE 101 &amp; 1011</td>
<td>Introduction to Electrical Engineering</td>
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<td>ENGL 110</td>
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<td>MATH 165</td>
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<td><strong>Sophomore Year</strong></td>
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<tr>
<td>EE 313 &amp; 313L</td>
<td>Linear Electric Circuits and Circuits Laboratory II</td>
<td>4</td>
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<tr>
<td>ENGR 460</td>
<td>Engineering Economy (SS)</td>
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<tr>
<td>MATH 208</td>
<td>Discrete Mathematics</td>
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<td>MATH 266</td>
<td>Elementary Differential Equations</td>
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<tr>
<td>PHYS 252</td>
<td>University Physics II</td>
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<td><strong>First Semester</strong></td>
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<tr>
<td>CSCI 230</td>
<td>Systems Programming</td>
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<td>EE 206 &amp; 206L</td>
<td>Circuit Analysis and Circuits Laboratory I</td>
<td>4</td>
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<td>EE 304</td>
<td>Computer Aided Measurement and Controls</td>
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<td>MATH 265</td>
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<td>PHYS 251</td>
<td>University Physics I</td>
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<td><strong>Junior Year</strong></td>
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<td>EE 405 &amp; 405L</td>
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<td>Distributed Networks</td>
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<td>EE 421 &amp; 421L</td>
<td>Electronics II and Electronics Lab II</td>
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| EE 452 & 452L                                   | Embedded Systems and Embedded Systems Design Laboratory | 4       |

| **First Semester**                               | **Credits** |
|----------------------------------------------------------------|
| EE 314 & 314L                                   | Signals and Systems and Signal and Systems Laboratory | 4       |
| EE 316                                           | Electric and Magnetic Fields | 3       |
| EE 318                                           | Engineering Data Analysis | 3       |
| EE 321                                           | Electronics I | 4       |
| EE 321L                                          | Electronics Laboratory I | 4       |
| EE 451                                          | Computer Hardware Organization | 3       |

| **Credits**                                      | **Total Credits** | **17**  |

| **Senior Year**                                  |                |         |
|----------------------------------------------------------------|
| EE 481                                          | Senior Design II | 5       |
| EE 480                                          | Senior Design I | 4       |
| Electrical Engineering Elective                  |                | 3       |
| Social Science Elective (SS)                     |                | 3       |

| **Credits**                                      | **Total Credits** | **12**  |

Ill-Grade "C" or better in all EE courses required for graduation. 1- May be waived for transfer students (substitute science credit required). 2- To meet the University's Essential Studies Breadth of Knowledge requirements, all students must complete 9 credits of Arts & Humanities Electives (minimum of 2 departments, including 3 Fine Arts credits and 3 Humanities credits) and 9 credits of Social Sciences Electives (minimum of 2 departments). Refer to the online Academic Catalog for a listing of acceptable Essential Studies courses. 3- To meet the University's Essential Studies Social-Cultural Diversity requirement, all students must complete 3 credits of Global (G) Diversity Electives and 3 credits of United States (U) Diversity Electives. Refer to the online Academic Catalog for a listing of acceptable Essential Studies G and U Diversity Electives. 4- EE 480 Senior Design I meets the Essential Studies Special Emphasis requirements for Advanced Communication (A) and Senior Capstone (C). EE 480 Prerequisites: EE 421 and EE 421L and two out of the four following classes: EE 401, EE 405, EE 409, EE 452. 5- EE 481 Senior Design II meets the Essential Studies Special Emphasis requirement for Oral Communication (O). 6- Maximum of three credits of EE 490 Advanced EE Problems allowed as an independent study, applicable to both EE and non-EE Electives. 2 credits of EE 397 Cooperative Education (40 hours/week) is equivalent to 3 credits of the EE Electives with S/U grading, maximum 4 credits of EE 397 is equivalent to maximum of 6 credits of EE Elective. 7- The Ethics Elective is a 3-credit course that meets Essential Studies requirements in either the Arts & Humanities or the Social Sciences. Ethics Elective choices: Phil 120 Introduction to Ethics (Humanities), ChE 340 Professional Integrity in Engineering (SS), ME 370 Engineering Disasters & Ethics (SS). 8- Computer Science Elective choices: Any Computer Science course, 300 level or higher. A maximum of three credits of CSCI 260 is permitted.

Students must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)
Geology

B.S. in Geology

Freshman Year

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<tr>
<th>Fall</th>
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<td>GEOL 101</td>
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<td>ENGL 110</td>
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<td>CHEM 121</td>
<td>General Chemistry I</td>
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<td>CHEM 121L</td>
<td>General Chemistry I Laboratory</td>
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<td>MATH 165</td>
<td>Calculus I</td>
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Credits: 15

Spring

| MATH 166        | Calculus II | 4 |
| PHYS 211        | College Physics I | 4 |
| PHYS 211CL      | College Physics I Laboratory | 1 |
| GEOL 102        | The Earth Through Time | 3 |
| GEOL 102L       | The Earth Through Time Laboratory | 1 |
| GEOL 318        | Mineralogy | 3 |

Credits: 16

Sophomore Year

Fall

| GEOL 220        | Computer Applications in Geology and Environmental Science | 2 |
| GEOL 256        | Critical Thinking in the Geosciences | 2 |

GEOL 256 should be taken as soon as a student declares his/her major. This course can be combined in one semester with GEOL 220. Both provide the student methods on how to be successful in their degree program, getting employment, and having a successful career.

| GEOL 320        | Petrology | 3 |
| CHEM 122        | General Chemistry II | 3 |
| CHEM 122L       | General Chemistry II Laboratory | 1 |
| PHYS 212        | College Physics II | 4 |
| PHYS 212CL      | College Physics II Laboratory | 1 |

Credits: 16

Spring

| ENGL 130        | Composition II: Writing for Public Audiences | 3 |
| GEOL 330        | Structural Geology | 3 |
| Approved Elective | 2 |
| Math Elective (Math 321, Math 265, or Psych 241) | 4 |
| Arts & Humanities Elective | 3 |

Credits: 16

Junior Year

Fall

| GEOL 311        | Geomorphology | 4 |
| MATH 266        | Elementary Differential Equations | 3 |
| Social Science Elective | 3 |
| Approved Elective | 2 |
| Arts & Humanities Elective | 3 |

Credits: 16

Spring

| GEOL 356        | Geoscience Lectures | 1 |
| GEOL 411        | Sedimentology and Stratigraphy | 5 |
| Approved Elective | 2 |
| Geology Elective | 1 |
| Social Science Elective | 3 |

Credits: 15

Senior Year

Fall

| GEOL 421        | Seminar I | 1 |

Credits: 1

GEOL 487 Research I Determine what type of Senior Thesis project you would like to consider early in your program. Discuss this with you advisor or faculty member you would like to work with.

| Geology Elective | 1 |
| Approved Elective | 2 |
| Approved Elective | 2 |
| Social Science Elective | 3 |

Credits: 14

Spring

| GEOL 420        | Geology Capstone | 3 |
| GEOL 422        | Seminar II | 1 |
| GEOL 488        | Research II | 2 |
| GEOL 494        | Senior Thesis | 1 |
| Arts & Humanities Elective | 3 |
| Approved Elective | 2 |
| Approved Elective | 2 |

Credits: 17

Total Credits: 125

1 = Approved Geology Electives (must complete 2 courses from list) Geol 321 Geochemistry, Geol 414 Applied Geophysics, Geol 415 Intro to Paleontology, GeoE 417 Hydrogeology. 2 = Student is required to complete 22-24 program approved courses in engineering, mathematics, foreign language, and other fields of student interest. There may be an additional approved elective required to complete 125 hours. The B.S. in Geology program is flexible to the extent that students can take different courses to complete graduation requirements (geochemistry or paleontology, for example). The student should meet with their geology advisor early to map out their interests in their degree program.

Students must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)

Mechanical Engineering

B.S. in Mechanical Engineering

Freshman Year

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<tr>
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<tr>
<td>CHEM 121</td>
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<td>CHEM 121L</td>
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<td>College Composition I</td>
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<tr>
<td>MATH 165</td>
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<tr>
<td>ME 101</td>
<td>Introduction to Mechanical Engineering</td>
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<tr>
<td>Arts and Humanities</td>
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Credits: 17

Second Semester

| ENGR 200       | Computer Applications in Engineering | 1 |
| ENGL 130       | Composition II: Writing for Public Audiences | 3 |
| MATH 166       | Calculus II | 1 |
| PHYS 251       | University Physics I | 1 |
| Arts and Humanities | 3 |

Credits: 16

Sophomore Year

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<tr>
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<tr>
<td>ENGR 201</td>
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<td>ME 201</td>
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<td>ME 341</td>
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Credits: 16
Second Semester
ENGR 202  Dynamics\(^1\)  3
ENGR 206  Fundamentals of Electrical Engineering  3
ENGR 203  Mechanics of Materials\(^1\)  3
MATH 266  Elementary Differential Equations  3
PHYS 253 or CHEM 122  University Physics III\(^2\) or General Chemistry II and General Chemistry II Laboratory  4

Credits  16

Junior Year
First Semester
ENGR 460  Engineering Economy  3
ME 301  Materials Science  3
ME 306  Fluid Mechanics  3
ME 322  Design of Machinery  3
Technical Elective\(^3\)  3

Credits  15

Second Semester
MATH 321  Applied Statistical Methods  3
ME 323  Machine Component Design  3
ME 323L  Machine Component Design Laboratory  1
ME 418  Manufacturing Processes  4
ME 474  Fundamentals of Heat and Mass Transfer  3

Credits  17

Senior Year
First Semester
ME 480  Mechanical Engineering Seminar  3
ME 483  Mechanical Measurements Laboratory  3
ME 487  Engineering Design  2
Social Science  3
Technical Electives\(^3\)  6

Credits  17

Second Semester
ME 370  Engineering Disasters and Ethics or CHE 340  3
ME 488  Engineering Design  3
Arts & Humanities  3
Technical Electives\(^3\)  6

Credits  15

Total Credits  129

1 = Must be completed with a grade of ‘C’ or better.  2 = Another lab science may be substituted for PHYS 253 or CHEM 122 by petition to the ME Department.  3 = One technical elective can be taken outside of the ME Department within another CEM Department, Math or Physics. The course must be at the 300-level or higher.

Students must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)
College of Nursing and Professional Disciplines

B.S. in Human Nutrition-Health Promotion Option (p. 295)

B.S. in Human Nutrition-Sciences Option (p. 296)

B.S. in Dietetics (p. 296)

B.S. in Nursing (p. 294)

B.S. in Social Work (p. 297)

Nursing

B.S. in Nursing

Freshman Year

First Semester

<table>
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<td>CHEM 115</td>
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<td>SOC 110</td>
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<td>or SOC 115</td>
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<td>or ANTH 171</td>
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Second Semester

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<td>CHEM 116</td>
<td>Introduction to Organic and Biochemistry *</td>
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<td>ANAT 204</td>
<td>Anatomy for Paramedical Personnel *</td>
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<td>Essential Studies *</td>
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Sophomore Year

First Semester

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<td>NURS 330</td>
<td>Foundations of Nursing Practice</td>
<td>3</td>
</tr>
<tr>
<td>NURS 301</td>
<td>Professional Nurse I</td>
<td>2</td>
</tr>
<tr>
<td>NURS 304</td>
<td>Nursing Pharmacology I</td>
<td>3</td>
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<tr>
<td>NURS 310</td>
<td>Health &amp; Illness I</td>
<td>2</td>
</tr>
<tr>
<td>NURS 312</td>
<td>Pathophysiology I</td>
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<td>NURS 313</td>
<td>Clinical Practicum I</td>
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Second Semester

<table>
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<tr>
<td>NURS 433</td>
<td>Clinical Practicum II</td>
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<tr>
<td>NURS 334</td>
<td>Nursing Pharmacology II</td>
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Senior Year

First Semester

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<tbody>
<tr>
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<td>Nursing Across the Lifespan Practicum</td>
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<td>NURS 404</td>
<td>Professional Nurse II</td>
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<tr>
<td>NURS 406</td>
<td>Evidence Informed Practice</td>
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<tr>
<td>NURS 420</td>
<td>Interprofessional Health Care</td>
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<td>NURS 430</td>
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Second Semester

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<td>Clinical Practicum IV</td>
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<td>NURS 444</td>
<td>Baccalaureate Nursing Review Course</td>
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<td>NURS 450</td>
<td>Transition to Practice: Seminar</td>
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<td>NURS 453</td>
<td>Clinical Practicum V: Transition to Practice</td>
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Total Credits 120

* Must be completed prior to admission to the Nursing program.
# Must be completed prior to beginning nursing courses.

Students are encouraged to meet with a Nursing Office of Student Services advisor regarding essential studies requirements. Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)
Nutrition & Dietetics

B.S. in Human Nutrition-Health Promotion Option

Freshman Year

Fall

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
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<tr>
<td>Introduction to Psychology</td>
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<td>College Algebra</td>
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<td>General Chemistry I</td>
<td>3</td>
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<tr>
<td>General Chemistry I Laboratory</td>
<td>1</td>
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<tr>
<td>General Introductory Chemistry</td>
<td>1</td>
</tr>
<tr>
<td>ENGL 110</td>
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<tr>
<td>PSYC 111</td>
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<td>MATH 103</td>
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<td>CHEM 121</td>
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<td>ALG 115</td>
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<td>CHEM 121L</td>
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<td>CHEM 115L</td>
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Spring

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<thead>
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<th>Course</th>
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<tbody>
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<td>Foodservice Safety and Sanitation</td>
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<td>General Chemistry II</td>
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<td>General Introductory Chemistry</td>
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Sophomore Year

Fall

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<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>Consumer Food Issues</td>
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<tr>
<td>Nutrition Through the Life Cycle</td>
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<tr>
<td>Anatomy for Paramedical Personnel</td>
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Spring

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<td>Human Physiology</td>
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<td>Survey of Organic Chemistry</td>
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Junior Year

Fall

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<tr>
<th>Course</th>
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<tbody>
<tr>
<td>World Food Patterns</td>
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<tr>
<td>Nutrition Education and Counseling</td>
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<tr>
<td>Community Nutrition</td>
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<td>Sociological Statistics</td>
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<td>Introduction to Statistics</td>
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<td>NUM 240</td>
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<td>PSYC 211</td>
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Spring

<table>
<thead>
<tr>
<th>Course</th>
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<tr>
<td>Sports Nutrition</td>
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<td>Nutritional Biochemistry</td>
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<td>Research in Nutrition and Dietetics</td>
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Senior Year

Fall

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<th>Course</th>
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<tbody>
<tr>
<td>Supervised Practice in Human Nutrition</td>
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Spring

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<td>Credits</td>
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Total Credits 120-126

Option A Courses (choose 5 courses from the list)

- N&D 260 Principles of Foods & Food Science
- N&D 380 Food Service Production & Management
- KIN 240 Introduction to Wellness
- MGMT 300 Principles of Management
- PHE 301 Principles & Foundation of Health Education
- PHE 307 Methods & Materials of Health Education
- T&L 252 Child Development
- PSYC 250 Developmental Psychology
- PSYC 355 Adulthood & Aging
- SOC 352 Aging & Society

Every student must fulfill all University, Departmental, and Essential Studies requirements. Students must complete enough electives to bring total credit hours up to the 120.

Nutrition & Dietetics

B.S. in Dietetics

Freshman Year

Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Fundamentals of Nutrition</td>
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<tr>
<td>College Composition I</td>
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<tr>
<td>Introduction to Psychology</td>
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<td>General Chemistry I Laboratory</td>
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<td>SOC 226</td>
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<td>Sociology</td>
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<tr>
<td>Introduction to Sociology</td>
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<td>Option A Course</td>
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Spring

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<tbody>
<tr>
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## Sophomore Year

### Fall

- **N&D 250**  Consumer Food Issues  3
- **N&D 335**  World Food Patterns  3
- **PPT 301**  Human Physiology  4
- **COMM 110**  Fundamentals of Public Speaking  3

### Credits

**Essential Studies**  3

### Spring

- **N&D 260**  Principles of Foods and Food Science  3
- **MGMT 300**  Principles of Management  3
- **CHEM 340**  Survey of Organic Chemistry  4
- **CHEM 340L**  Survey of Organic Chemistry Laboratory  1

### Credits

**Essential Studies**  6

### Application in February for fall semester admission to professional component

Every student must fulfill all University, Departmental, and Essential Studies requirements. [University website](https://und.edu/academics/essential-studies)
Senior Year

Fall
N&D 497 Supervised Practice in Human Nutrition 180-270 credits 4-6

Must have a 2.2 GPA, satisfactory completion of service learning requirements, and prior or concurrent completion of N&D 344 and N&D 345. Must have a C or better in your nutrition, foods, and science courses. Application by October 20 for spring supervised practice or by March 20 for summer and fall supervised practice.

Essential Studies (FA/Hum) or Elective 9

Credits 13-15

Spring
N&D 441 Nutritional Biochemistry 4
N&D 494 Research in Nutrition and Dietetics 1
Essential Studies (FA/Hum) or Elective 9

Credits 14

Total Credits 120-123

Option B Courses (choose 5 courses from the list)

BIOL 150 General Biology I
BIOL 151 General Biology II
BIOL 341 Cell Biology
BMB 301 Biochemistry
PPT 315 Human Pharmacology
PPT 410 Drugs Subject to Abuse
PSYC 250 Developmental Psychology
PSYC 355 Adulthood & Aging
SOC 352 Aging & Society
SOC 355 Drugs & Society

Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies) Students must complete enough electives to bring total credit hours up to the 120.

Social Work

B.S. in Social Work

Freshman Year

First Semester
ENGL 110 College Composition I 3
PSYC 111 Introduction to Psychology 3
SOC 110 Introduction to Sociology 3
Essential Studies Approved Lab Science 4
Essential Studies Approved Humanities course 3

Credits 16

Second Semester
POL S 115 American Government I 3
ENGL 130 Composition II: Writing for Public Audiences 3
Essential Studies Approved Fine Arts course 3
Essential Studies Approved Fine Arts or Humanities course 3
Essential Studies Elective 3

Credits 15

Sophomore Year

First Semester
SWK 255 Introduction to Social Work 4
COMM 110 Fundamentals of Public Speaking 3
Program Elective 3

Credits 16

Second Semester
SWK 257 Human Behavior and the Social Environment I 3
Program Elective 3
Program Elective 3
Program Elective 3
General Electives 6

Credits 15

Junior Year

First Semester
*Admission to the Social Work Program Required*
SWK 317 Social Work Research 3
SWK 357 Human Behavior and the Social Environment II 3
Social Work Elective See advisor for available options 3
Program Elective 3
Program Elective 3

Credits 15

Second Semester
SWK 424 Generalist Social Work Practice with Individuals and Families 3
SWK 434 Generalist Social Work Practice with Task and Treatment Groups 3
Program Elective 3
General Electives 6

Credits 15

Senior Year

First Semester
SWK 442 Social Policy 3
SWK 454 Generalist Social Work Practice with Communities and Organizations 3
General Electives 10

Credits 16

Second Semester
SWK 481 Field Education I 5
SWK 482 Field Education Seminar I 1
SWK 483 Field Education II 5
SWK 484 Field Education Seminar II 1

Credits 12

Total Credits 120

This is a sample curriculum. Please consult with your advisor for course options.

Students must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)

John D. Odegard School of Aerospace Sciences

B.S. in Aeronautics (p. 298)

B.S. in Atmospheric Sciences (p. 298)
### Atmospheric Sciences

#### B.S. in Atmospheric Sciences

**Freshman Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ATSC 100</td>
<td>Atmospheric Sciences Orientation</td>
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<td>Meteorology I</td>
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<th>Credits</th>
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<tr>
<td>MATH 166</td>
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<td>Introduction to Scientific Programming</td>
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<td>ENGL 130</td>
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**Sophomore Year**

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<tbody>
<tr>
<td>ATSC 210</td>
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<td>Calculus III</td>
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<td>PHYS 251</td>
<td>University Physics I</td>
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<td>Computer Concepts in Meteorology</td>
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<td>University Physics II</td>
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**Junior Year**

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<tbody>
<tr>
<td>ATSC 345</td>
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<td>ATSC 350</td>
<td>Atmospheric Thermodynamics</td>
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<td>MATH 266</td>
<td>Elementary Differential Equations</td>
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<tbody>
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<td>Dynamic Meteorology</td>
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<td>MATH 321</td>
<td>Applied Statistical Methods</td>
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<tr>
<td>or ECON 210</td>
<td>or Introduction to Business and Economic Statistics</td>
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**Senior Year**

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<th>Fall</th>
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<tbody>
<tr>
<td>ATSC 405</td>
<td>Numerical Methods in Meteorology</td>
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<tr>
<td>ATSC 411</td>
<td>Synoptic Meteorology</td>
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<td>Senior Project I</td>
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<tr>
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<td>Mesoscale Dynamics</td>
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### Aviation

#### B.S. in Aeronautics with a Major in Air Traffic Control (p. 298)

#### B.S. in Aeronautics with a Major in Aviation Technology Management (p. 299)

#### B.S. in Aeronautics with a Major in Commercial Aviation (p. 300)

#### B.S. in Aeronautics with a Major in Flight Education (p. 300)

#### B.S. in Aeronautics with a Major in Unmanned Aircraft Systems (p. 301)

### B.S. in Aeronautics with a Major in Air Traffic Control

#### Freshman Year

<table>
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<th>Credits</th>
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<tr>
<td>AVIT 100</td>
<td>Aviation Orientation</td>
</tr>
<tr>
<td>AVIT 103</td>
<td>Introduction to Air Traffic Management</td>
</tr>
<tr>
<td>MATH 103</td>
<td>College Algebra</td>
</tr>
<tr>
<td>ENGL 110</td>
<td>College Composition I</td>
</tr>
<tr>
<td>COMM 110</td>
<td>Fundamentals of Public Speaking</td>
</tr>
<tr>
<td>Essential Studies: Social Science</td>
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<tr>
<td><strong>Total Credits</strong></td>
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<table>
<thead>
<tr>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>AVIT 102</td>
<td>Introduction to Aviation</td>
</tr>
<tr>
<td>AVIT 260</td>
<td>Control Tower Operations I</td>
</tr>
<tr>
<td>ATSC 110</td>
<td>Meteorology I</td>
</tr>
<tr>
<td>ATSC 110L</td>
<td>Meteorology I Laboratory</td>
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#### Sophomore Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
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<tbody>
<tr>
<td>AVIT 250</td>
<td>Human Factors</td>
</tr>
<tr>
<td>AVIT 261</td>
<td>RADAR Operations I</td>
</tr>
<tr>
<td>ENGL 130</td>
<td>Composition II: Writing for Public Audiences</td>
</tr>
<tr>
<td>Essential Studies: Fine Arts</td>
<td></td>
</tr>
<tr>
<td>Essential Studies: Math, Science, and Tech</td>
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<table>
<thead>
<tr>
<th>Spring</th>
<th>Credits</th>
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<tbody>
<tr>
<td>AVIT 126</td>
<td>Introduction to UAS Operations</td>
</tr>
<tr>
<td>AVIT 208</td>
<td>Aviation Safety</td>
</tr>
<tr>
<td>AVIT 363</td>
<td>RADAR Operations II</td>
</tr>
<tr>
<td>COMM 212</td>
<td>Interpersonal Communication</td>
</tr>
<tr>
<td>Electives towards second major/minor</td>
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#### Junior Year

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<tr>
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<tbody>
<tr>
<td>AVIT 362</td>
<td>Advanced Tower Operations II</td>
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B.S. in Aeronautics with a Major in Aviation Technology Management

**Freshman Year**

**Fall**

- AVIT 100  Aviation Orientation  
- AVIT 126  Introduction to UAS Operations  
- ATSC 110  Meteorology I  
- ATSC 110L  Meteorology I Laboratory  
- COMM 110  Fundamentals of Public Speaking  
- Essential Studies: Social Science  
- Electives towards second major/minor  
  **Credits**  

**Spring**

- AVIT 102  or AVIT 105  Introduction to Aviation (OR AVIT 142 and AVIT 143) or Essentials of Flight  
- AVIT 103  Introduction to Air Traffic Management  
- ENGL 110  College Composition I  
- MATH 103  College Algebra  
- Essential Studies: Fine Arts or Humanities  
  **Credits**  

**Sophomore Year**

**Fall**

- AVIT 208  Aviation Safety  
- AVIT 250  Human Factors  
- ENGL 130  Composition II: Writing for Public Audiences  
- Essential Studies: Fine Arts  
- Essential Studies: Social Science  
  **Credits**  

**Spring**

- Essential Studies: Social Science  
- Essential Studies: Humanities  
- Program Electives  
- Free Electives  
  **Credits**  

**Junior Year**

**Fall**

- AVIT 402  or AVIT 405  or AVIT 407  Airport Planning and Administration or Airline Operations and Management or General Aviation Operations and Management  
- AVIT 403  Aerospace Law  
- Program Electives  
- Free Electives  
  **Credits**  

**Spring**

- AVIT 405  or AVIT 402  or AVIT 407  Airline Operations and Management or Airport Planning and Administration or General Aviation Operations and Management  
- Program Electives  
- Free Electives  
  **Credits**  

**Senior Year**

**Fall**

- Program Electives  
- Free Electives  
  **Credits**  

**Spring**

- AVIT 485  Aviation Senior Capstone  
- Program Electives  
- Free Electives  
  **Credits**  

**Total Credits**  

Students must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)
B.S. in Aeronautics with a Major in Commercial Aviation

Freshman Year

Fall

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
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<td>ATSC 110L</td>
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Spring

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<thead>
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<th>Course</th>
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<tbody>
<tr>
<td>AVIT 221</td>
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<td>AVIT 208</td>
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<tr>
<td>ENGL 130</td>
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Sophomore Year

Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>AVIT 222</td>
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<tr>
<td>AVIT 250</td>
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<td>COMM 110</td>
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<td>MATH 103</td>
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Spring

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<tr>
<td>AVIT 323</td>
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<td>AVIT 324</td>
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Junior Year

Fall

<table>
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<tr>
<th>Course</th>
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<tbody>
<tr>
<td>AVIT 325</td>
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<tr>
<td>AVIT 327</td>
<td>2</td>
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<tr>
<td>ATSC 231</td>
<td>4</td>
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<tr>
<td>ENGL 227</td>
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<tr>
<td>or ENGL 228</td>
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<tr>
<td>or ENGL 229</td>
<td></td>
</tr>
<tr>
<td>or ENGL 308</td>
<td></td>
</tr>
<tr>
<td>or ISBC 320</td>
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<tr>
<td>Essential Studies: Social Science</td>
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<td>Elective</td>
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Spring

<table>
<thead>
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<th>Course</th>
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<tbody>
<tr>
<td>AVIT 402</td>
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<tr>
<td>or AVIT 405</td>
<td></td>
</tr>
<tr>
<td>or AVIT 407</td>
<td></td>
</tr>
<tr>
<td>ATSC 110</td>
<td>3</td>
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<td>ATSC 110L</td>
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<td>ENGL 110</td>
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Senior Year

Fall

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<td>AVIT 421</td>
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<td>AVIT 428</td>
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AVIT 430  Crew Resource Management  3

Spring

<table>
<thead>
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<tbody>
<tr>
<td>AVIT 402</td>
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</tr>
<tr>
<td>or AVIT 405</td>
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</tr>
<tr>
<td>or AVIT 407</td>
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</tr>
<tr>
<td>ATSC 110</td>
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</tr>
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<td>ATSC 411</td>
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<td>AVIT 480</td>
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<tr>
<td>AVIT 485</td>
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<tr>
<td>Elective</td>
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</table>

Total Credits: 120

Students must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)

B.S. in Aeronautics with a Major in Flight Education

Freshman Year

Fall

<table>
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<tr>
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<th>Credits</th>
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<tbody>
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<td>AVIT 100</td>
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<tr>
<td>AVIT 102</td>
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<td>AVIT 103</td>
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<tr>
<td>ATSC 110</td>
<td>3</td>
</tr>
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<td>ATSC 110L</td>
<td>1</td>
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<tr>
<td>ENGL 110</td>
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Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>AVIT 221</td>
<td>3</td>
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<tr>
<td>AVIT 208</td>
<td>3</td>
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<tr>
<td>ENGL 130</td>
<td>3</td>
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Sophomore Year

Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>AVIT 222</td>
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<td>AVIT 250</td>
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<tr>
<td>MATH 103</td>
<td>3</td>
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<tr>
<td>Essential Studies: Humanities</td>
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<tr>
<td>Essential Studies: Social Science</td>
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Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>AVIT 309</td>
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<tr>
<td>AVIT 323</td>
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<td>AVIT 324</td>
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Junior Year

Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>AVIT 325</td>
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<tr>
<td>or ENGL 308</td>
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<tr>
<td>or ISBC 320</td>
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<td>Essential Studies: Social Science</td>
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<td>Elective</td>
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Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>AVIT 402</td>
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<td>ATSC 110</td>
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<td>AVIT 480</td>
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<td>AVIT 485</td>
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<tr>
<td>Elective</td>
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### Aircraft Systems

B.S. in Aeronautics with a Major in Unmanned Aircraft Systems

<table>
<thead>
<tr>
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<th>Credits</th>
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<tbody>
<tr>
<td>Fall</td>
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<tr>
<td>AVIT 100</td>
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<tr>
<td>AVIT 126</td>
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<td>3</td>
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<tr>
<td>ATSC 110L</td>
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<td>ENGL 110</td>
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<tr>
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<td>ENGL 130</td>
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<tr>
<td>MATH 103</td>
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<th>Credits</th>
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<tbody>
<tr>
<td>Fall</td>
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<tr>
<td>AVIT 208</td>
<td>3</td>
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<tr>
<td>AVIT 221</td>
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### B.S. in Computer Science

#### Freshman Year

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<tr>
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<td>3</td>
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<tbody>
<tr>
<td>CSCI 161</td>
<td>4</td>
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<tr>
<td>MATH 208</td>
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<tr>
<td>COMM 110</td>
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### Computer Science

#### B.S. in Computer Science

<table>
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<th>Credits</th>
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<tbody>
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<tr>
<td>CSCI 160</td>
<td>4</td>
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<tr>
<td>MATH 107</td>
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<tbody>
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<td>CSCI 161</td>
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<td>MATH 208</td>
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<tr>
<td>COMM 110</td>
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<tr>
<td>E.S. Social Science Elective</td>
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</table>
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School of Medicine and Health Sciences

B.S. in Athletic Training (Sports Medicine)
### Medical Laboratory Science

#### B.S. in Medical Laboratory Science

<table>
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<th>Fall</th>
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<td>General Biology I</td>
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<td>General Biology I Laboratory</td>
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<td></td>
<td>CHEM 121</td>
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<td></td>
<td>MATH 103</td>
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<tr>
<td></td>
<td>BIOL 151</td>
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<td>ENGL 130</td>
<td>Composition II: Writing for Public Audiences</td>
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<table>
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<th>Fall</th>
<th>Credits</th>
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<tbody>
<tr>
<td></td>
<td>MLS 101</td>
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<td>ANAT 204</td>
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<td>MBIO 202</td>
<td>Introductory Medical Microbiology Lecture</td>
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<td>COMM 212</td>
<td>Interpersonal Communication</td>
</tr>
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<td></td>
<td></td>
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<thead>
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<th>Senior Year</th>
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<td>Exercise Physiology</td>
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<td>SMED 491</td>
<td>Seminar in Athletic Training</td>
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<td>SMED 312</td>
<td>Medical Aspects of Sports</td>
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<td><strong>Credits</strong></td>
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<td><strong>Total Credits</strong></td>
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Admission to the professional program is competitive. Minimum standards are listed in the Academic catalog.

Students must complete enough electives to bring total credit hours up to the 125. Special Emphasis courses can fulfill an essential studies requirement (example-History 104, US History, will count toward the US Diversity as well as the Humanities area). Please Note: Every student must fulfill all University, Departmental, and Essential Studies requirements. (https://und.edu/academics/essential-studies)
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125. Special Emphasis courses can fulfill an essential studies requirement
(example-History 104, US History, will count toward the US Diversity as well
as the Humanities area). Please Note: Every student must fulfill all University,
Departmental, and Essential Studies requirements. (https://und.edu/academics/
essential-studies)
The School of Graduate Studies

Mission
The School of Graduate Studies has responsibility for all graduate work at the University except for that leading to the Doctor of Medicine (M.D.) and Juris Doctorate (J.D.). It is the purpose of the School of Graduate Studies to provide opportunity for advanced study beyond the limits of undergraduate courses, to make available the resources of the University in such combinations as will meet the occupational, intellectual, and cultural needs of qualified post-baccalaureate students, and to encourage original investigation and creative scholarship. The University of North Dakota offers the largest and most diversified graduate school in the region. A number of unique facilities and support resources augment the instructional and research program. In addition, the School of Graduate Studies offers extensive off-campus programs through the Division of Continuing Education.

The School of Graduate Studies: General Information

The School of Graduate Studies provides qualified post-baccalaureate students with the opportunity for advanced study toward a graduate degree or certificate. The School of Graduate Studies promotes excellence in scholarship and creativity, and encourages original research and competency in technical and professional fields. The School of Graduate Studies is responsible for general supervision of all graduate activity in the departments, schools, and colleges of the University.

Graduate level courses are offered through various delivery modes. Opportunities for on-campus, online, and combinations of on-campus/online study exist for many programs. Students should consult with individual programs or the School of Graduate Studies for information regarding on-campus and online programming. Students wishing to enroll in distance courses and programs must follow all School of Graduate Studies policies and procedures.

The School of Graduate Studies is a member of the Midwest Association of Graduate Schools, the Western Association of Graduate Schools, the American Indian Professional Association, the Association for Graduate Enrollment Management, the Center for Academic Integrity, the American Association of Collegiate Registrars and Admissions Officers, and the Midwestern Association of Graduate Admissions Professionals. The School of Graduate Studies is one of the one hundred charter members of the Council of Graduate Schools in the United States.

The Dean is the chief administrative officer of the School of Graduate Studies. School of Graduate Studies policy is set by the Graduate Faculty which is made up of the President, the Vice President for Academic Affairs, the Dean of the School of Graduate Studies, and members of the University faculty who have been approved for membership on the Graduate Faculty. A full listing of the Graduate Faculty is available on the School of Graduate Studies website: http://graduateschool.und.edu. Only members of the Graduate Faculty normally may serve on Faculty Advisory Committees and serve as advisors for graduate students.

School of Graduate Studies: Academic Programs
Graduate degrees are offered within seven Colleges or Schools as listed below:

- College of Business and Public Administration: Accountancy, Applied Economics, Business Administration, and Public Administration
- John D. Odegard School of Aerospace Sciences: Aerospace Sciences, Atmospheric Sciences, Aviation, Earth System Science, Space Studies
- School of Medicine and Health Sciences: Biomedical Sciences, Clinical and Translational Science, Medical Lab Science, Occupational Therapy, Physical Therapy, Physician Assistant Studies, Public Health

The Graduate Committee
The Graduate Committee is the executive council of the Graduate Faculty. In this capacity it is advisory to the Dean of the School of Graduate Studies and serves as the School of Graduate Studies Curriculum Committee. The Graduate Committee is responsible for hearing appeals of decisions on student academic matters rendered by the Dean of the School of Graduate Studies. The voting membership of the Graduate Committee consists of thirteen full members of the Graduate Faculty. These thirteen members of the Graduate Committee are elected by those members of the Graduate Faculty from each of thirteen academic areas, with each person elected to serve a three-year term. Non-voting ex officio members of the Graduate Committee include the Dean of the School of Graduate Studies, any Associate Dean(s), and the appointed graduate student member. The graduate student member must be enrolled in the School of Graduate Studies and will serve a one-year term. The membership roster of the Graduate Committee is available from the School of Graduate Studies and is posted on the School of Graduate Studies website.

Assessment
As an institution of higher education, the university is committed to ongoing assessment of student learning at all levels and in all programs. Assessment of student learning is essential in order for the University to improve educational programs and the experiences of students. Students and faculty are encouraged to respond when asked to participate in surveys and other assessment activities. Students are also encouraged to collaborate in the planning and development of assessment activities and to make suggestions for improvements.

Degrees Granted
The degrees conferred for graduate work are the Master of Arts (M.A.), Master of Physician Assistant Studies (M.P.A.S.), Master of Science (M.S.), Master of Education (M.Ed.), Master of Business Administration (M.B.A.), Master of Engineering (M.Engr.), Master of Environmental Management (M.E.M.), Master of Fine Arts (M.F.A.), Master of Music (M.M.), Master of Occupational Therapy
Minimum General School of Graduate Studies Admission Requirements

1. A four-year bachelor’s degree or equivalent from a regionally accredited college or university (for U.S. degrees, accreditation by MSA, NASC, NCA, NEASC-CHE, SACS-CC, or WACS, Sr.). Exceptions to this policy must be approved by the Dean of the School of Graduate Studies. For combined degree programs, refer to the admission requirements under each department.

2. A cumulative Grade Point Average (GPA) of at least 2.75 for all undergraduate work (2.5 for M.Engr.) or a GPA of at least 3.00 for the junior and senior years of undergraduate work (based on A = 4.00).

3. ADMISSIONS TESTS. All graduate admissions tests (GMAT, GRE, TOEFL, etc.) must be sent directly by the Testing Service. The institution code for the University of North Dakota is 6878 for the GRE, TOEFL, and GMAT. The institution code for the MAT is 1380. Photocopies of test scores are not accepted. Not all graduate programs require testing for admission. Please consult the School of Graduate Studies website (http://graduateschool.und.edu) for current information on admission tests.

4. All graduate applicants must demonstrate academic-level proficiency with the English language before they will be considered for approved status admission. This requirement must be met by all applicants, regardless of citizenship, residency, or nation of birth. No applicants will be considered for approved admission status until the English Language Proficiency Requirement has been met. The English Proficiency Requirement will not be waived for any reason. This requirement may be satisfied in any of the following ways:
   a. A bachelor’s degree or higher from a recognized institution in the United States, England, Scotland, Ireland, Wales, Jamaica, Australia, New Zealand, or English Speaking Canada;
   b. An overall band score on the IELTS of at least 6.0;
   c. A satisfactory score on the Test of English as a Foreign Language (TOEFL). For the internet-based TOEFL (TOEFL iBT) an overall score of 76 is required.
   d. Successful completion of English Language Service (ELS) Language Center’s Intensive Level 112.

The programs below require additional and/or higher scores on the TOEFL test to be considered for admission.

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<thead>
<tr>
<th>Program</th>
<th>Listening</th>
<th>Writing</th>
<th>Reading</th>
<th>Speaking</th>
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<tbody>
<tr>
<td>Accountancy</td>
<td>79</td>
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<tr>
<td>Applied Economics</td>
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<td></td>
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<tr>
<td>Atmospheric Sciences</td>
<td>76</td>
<td>19</td>
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<td>Business Administration</td>
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<td>College Teaching</td>
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<td>19</td>
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<td>Communication</td>
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<td>Earth</td>
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<td>System Science and Policy</td>
<td>76</td>
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<td>Educational Foundations and Research</td>
<td>76</td>
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<tr>
<td>English Language Learner</td>
<td>76</td>
<td>18</td>
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</tr>
</tbody>
</table>

Additional Information

For detailed information students should consult the School of Graduate Studies Section of this Catalog or go to the School of Graduate Studies website at: http://graduateschool.und.edu. Address inquiries to the Dean of the School of Graduate Studies, 264 Centennial Drive, Mail Stop 8178, University of North Dakota, Grand Forks, ND 58202; Telephone (701) 777-2784; or 1-800-CALL-UND; or email at: gradschool@und.edu.

Admissions Policies and Procedures

Application for Admission to School of Graduate Studies (http://und-public.courseleaf.com/graduateacademicinformation/admission/application)

Minimum General School of Graduate Studies Admission Requirements (p. 306)

Categories of Admission (p. 307)

Eligibility for Faculty to Pursue a Graduate Degree (p. 308)

Eligibility to Work for an Advanced Degree (p. 308)

Matriculation (p. 308)
recommendations for each application. Because test scores have expiration
officially so long as the transcripts have been retained according to UND's
The School of Graduate Studies will use transcripts which were received
until it has been reviewed and approved by the Dean of the School of Graduate
complete, it will be forwarded to the program for evaluation. Each graduate
status of the application by the applicant is advisable. Once an application is
It is the applicant's responsibility to ensure that the School of Graduate Studies
has received all application materials and have a status of incomplete at the fourth
week census of the semester indicated on the application are administratively
denied.

Students who meet all of the stated admission requirements are eligible
for consideration for Approved Status admission, but are not guaranteed
admission. The entering classes will be chosen from all qualified applicants on
the basis of the quality of the applicants' previous work, the adequacy of their
preparation for graduate study at UND, and enrollment capacity. The School
of Graduate Studies reserves the right to refuse admission to any applicant
on the basis of scholastic or other reasons. Applicants who do not meet all of
the requirements for Approved admission may be considered for Provisional
admission status.

Application Policies
Applications are considered only for the program, degree, and admit term
indicated on the application. A person must submit separate applications for
each program, degree, and admit term he or she wishes to be considered for
admission. An applicant may change the program, degree, and/or admit term of
a submitted application one time, but not after an admission decision has been
published regarding the application.

Applications for which the School of Graduate Studies has not received all of
the required application materials and have a status of incomplete at the fourth
week census of the semester indicated on the application are administratively
denied.

Some programs have additional admission requirements or require
supplemental information at the time of application. Please consult the
individual program listings in this catalog or contact the School of Graduate
Studies for more information.

Students who meet all of the stated admission requirements are eligible
for consideration for Approved Status admission, but are not guaranteed
admission. The entering classes will be chosen from all qualified applicants on
the basis of the quality of the applicants' previous work, the adequacy of their
preparation for graduate study at UND, and enrollment capacity. The School
of Graduate Studies reserves the right to refuse admission to any applicant
on the basis of scholastic or other reasons. Applicants who do not meet all of
the requirements for Approved admission may be considered for Provisional
admission status.

Application Materials
Transcripts, references, and/or any other materials sent prior to submission
of an application will be kept active for six months. Applicants should send
all application materials directly to the School of Graduate Studies, not to the
program to which they are applying.

It is the applicant's responsibility to ensure that the School of Graduate Studies
has received all application materials; therefore, periodically checking on the
status of the application by the applicant is advisable. Once an application is
complete, it will be forwarded to the program for evaluation. Each graduate
program makes its own admission recommendation, but the decision is not final
until it has been reviewed and approved by the Dean of the School of Graduate
Studies.

The School of Graduate Studies will use transcripts which were received
officially so long as the transcripts have been retained according to UND's
Records Retention Policy. Because written statements (statement, goals, essays, etc.) and letters of recommendation are written to a specific
program, an applicant must provide new written statements and letters of
recommendations for each application. Because test scores have expiration
dates, a test score must be considered current by the testing agency in order to
be used for an application.

Categories of Admission
Applicants for degree or certificate programs may be admitted to Approved,
Qualified, Provisional, or Deferred status. The School of Graduate Studies has
established minimum academic criteria for admission. Individual departments
may have additional requirements. The various categories of admission are
detailed in the following paragraphs.

Approved Status
Applicants who have met the minimum admission requirements stipulated by
the School of Graduate Studies and have met all departmental requirements
for admission may be admitted into Approved status. Admission to this status
implies only that a student is permitted to commence graduate work which
normally will lead to a degree, diploma, or certificate. However, admission to
Approved status does not guarantee that a student will be allowed to become a
candidate for a degree or diploma.

Provisional Status
Admission to Provisional status may be granted to an applicant who has not
met one or more of the general School of Graduate Studies or program level
admission requirements, e.g., low G.P.A., low test scores, lack of a required
test, or other concerns about the applicant's ability to succeed in graduate
study. Generally, students will not be admitted into Provisional status with more
than nine (9) credits of outstanding prerequisites.

Students admitted to Provisional status because of their previous GPA will
be eligible for advancement to Approved status after the completion of nine
semester hours of graduate level coursework if their GPA for all work attempted
is at least 3.00. Students in a Provisional status may be dismissed after one
registration if their GPA is below 3.00, or if they have failed to meet other
conditions specified at the time of admission.

The first obligation of students admitted to Provisional status is to meet all of
the conditions specified at the time of admission. Students in Provisional status
are eligible for graduate assistantships and tuition waivers at the discretion of
the department.

Conditional Status
Admission to Conditional status may be granted to an applicant who has not
met the English Language Proficiency requirement set by the School of
Graduate Studies and is enrolled in or will be enrolling in the ELS Language
Centers Intensive English Program. Students admitted under conditional status
will not be allowed to enroll in courses until after they have passed the ELS
Language Center's Intensive Level 112.

Non-Degree Status
Applicants who wish to enroll in graduate level classes as a non-degree
seeking student should seek admission into Non-Degree status. All applicants
for non-degree status must have met the English Language Proficiency
Requirement, and have a recognized baccalaureate degree. Permission of
the academic department will be required to enroll in a class as a non-degree
student. Therefore, the applicant should consult with the department(s) offering
the courses before completing an application. Subject to the approval of the
department and the Dean of the School of Graduate Studies, a maximum
of nine (9) semester credits taken as a graduate Non-Degree student may
subsequently be counted toward a graduate degree subject to all other
regulations. Non-degree students are not eligible for graduate teaching,
research, or service assistantships or School of Graduate Studies tuition
waivers.

Post-Baccalaureate Status
The purpose of this status is to provide a procedure for individuals to take a
limited amount of academic work for cultural, intellectual, continuing education
needs, or with the intent to complete prerequisite coursework for an eventual
application to a graduate program. A student registered in Post-Baccalaureate
status may not change to another status until the completion of the term.
Students in Post-Baccalaureate status are not eligible for graduate teaching,
research, or service assistantships or School of Graduate Studies tuition waivers.

Eligibility for Faculty to Pursue Graduate Degree

A faculty member at any rank may take coursework toward a degree at the University if he or she has the approval of the dean of his or her college or school. Members of the Graduate Faculty must also obtain approval of the Graduate Dean. Upon enrollment in a graduate program, graduate faculty membership, and faculty rank or role in any department in which the coursework is being taken, will be suspended. The suspended faculty rank and role, including graduate faculty membership, will be automatically reinstated upon completion of the graduate degree or departure from the degree program. Any member of the faculty may, with the approval of the dean and of the instructors concerned, take courses for credit as non-degree seeking students without changing his or her faculty status. Arrangements to audit classes or to take courses for credit are made through the School of Graduate Studies and/or Registrar's Office. (Reference: UND Faculty Handbook)

Eligibility to Work for an Advanced Degree

Only those who have been officially admitted to the School of Graduate Studies as Degree Students on the basis of a letter from the Dean of the School of Graduate Studies may work for an advanced degree. Any conditions stipulated in the admission letter must be satisfied according to the terms of the letter. Degree or certificate students who do not satisfy the conditions of the admission letter will be dismissed. Students may petition the School of Graduate Studies for an extension if they are unable to satisfy the conditions of admission. Such petitions must be filed prior to any deadlines that are in the admissions letter.

Matriculation

Delaying or Moving Matriculation

An applicant offered admission to a degree or certificate program in the School of Graduate Studies may request to delay or move his/her matriculation into the program for up to one year. Requests to delay or move matriculation will require approval of the program faculty and the School of Graduate Studies. There is no guarantee that students denied delayed matriculation will be offered admission at a later date.

Matriculation Requirement

Students who do not enroll in program specific coursework as specified in the admission letter the semester that they are admitted, and do not gain approval to delay or move their matriculation, will have their admission offer rescinded. In such instances, a new application for future enrollment will need to be submitted with no guarantee that the application will result in another offer of admission. Academic departments may petition the Dean of the School of Graduate Studies for exceptions to this policy.

Note to International Students

It is strongly recommended that the application be completed three months prior to the term in which the applicant wishes to matriculate.

In general, the following guidelines indicate the level of preparation expected of all international applicants for admission to UND:

India, Pakistan, Bangladesh, Nepal: 1st Class Bachelor's degree in engineering or medicine with a minimum of four years of study; master's degree in all other fields.

Other Asian countries: Bachelor's degree requiring a minimum of four years of study.

British or British-patterned education: Bachelor's degree with honors with a minimum of four years of study.

French or French-patterned education: Diplome with a minimum of four years of post-baccalaureate study.

Other European, Latin American, Middle Eastern countries or Canada: University degree requiring a minimum of four years of study.

Three-year Bologna process degrees from countries within the European Union will be considered on an individual basis. Three-year degrees from other countries may also be considered. Applicants may be requested to provide a credential course-by-course transcript evaluation in addition to official transcripts from their university.

All graduate applicants must demonstrate academic-level proficiency with the English language before they will be considered for approved admission status. This requirement must be met by all applicants, regardless of citizenship, residency, or nation of birth. The English Proficiency Requirement will not be waived for any reason.

International students are required to submit a certification of finances to the Office of International Programs after an offer of admission has been made. Approximately $35,000 annually is required for educational and living expenses.

Applicants admitted to a graduate program will be issued an I-20 Form after all required documentation has been submitted.

Academic Policies and Procedures

Academic Standards, Probation, Dismissal (p. 309)
Accelerated Combined Degree Programs (p. 309)
Assistantships (p. 311)
Challenge Examinations (p. 310)
Common Course Numbers (p. 310)
Continuing Enrollment - 996 (p. 311)
Enrolling in More Than One Program (p. 311)
Faculty Appointments (p. 311)
Grades (p. 313)
Graduate Cooperative Education (p. 313)
Graduate Credit (p. 314)
Graduate Application for Degree or Diploma (p. 314)
Leave of Absence (p. 314)
Maximum and Minimum Academic Load (p. 314)
Maximum Period Allowed and Revalidation of Courses (p. 314)
Minors and Cognates (p. 315)
Program of Study (p. 315)
Registration Policies and Procedures (p. 315)
Residence Requirements (p. 316)
Transfer of Graduate Credits (p. 318)
Academic Standards, Probation and Dismissal

A cumulative grade point average (GPA) of at least 3.00 for all work taken as a graduate student (2.75 for M.Eng.) while registered in the UND School of Graduate Studies must be maintained in order to remain in satisfactory academic standing in the School of Graduate Studies. In addition to maintaining the required GPA, satisfactory performance also includes, but is not limited to, satisfactory research performance, a satisfactory GPA in the major, satisfactory performance in examinations, such as the comprehensive examination, or satisfactory performance in other specific program requirements.

The academic standing and progress of degree seeking Students will be reviewed by the departments and Faculty Advisory Committee periodically to ensure that appropriate progress is being made toward the degree.

The academic standing of all graduate students whose cumulative GPA falls below 3.00 (2.75 for Master of Engineering program) will be reviewed at the end of each academic term by the Dean of the School of Graduate Studies. Students having accumulated 9 or more credit hours will be placed on academic probation for one semester; students having accumulated fewer than 9 credit hours will be placed on academic probation until either

1. the GPA is raised to at least 3.00 (2.75 for M.Engr.) or
2. 9 graduate credit hours are accumulated, whichever occurs first.

If, at the end of the probationary period, the GPA is still less than 3.00 (2.75 for M.Engr.), the student will be dismissed.

Students may be dismissed from the School of Graduate Studies for failure to maintain the required academic standing as described in this graduate catalog. Dismissal from the School of Graduate Studies will be noted on the transcript. The Graduate Committee will hear grievances brought by graduate students regarding dismissal decisions made by the Dean of the School of Graduate Studies. No decision on dismissal will be reached until a minimum of 9 graduate credits has been accumulated. A student who has been dismissed from the School of Graduate Studies will not be allowed to take any graduate courses or enter any graduate program at the School of Graduate Studies.

Creating an Accelerated Bachelor's/Master's Program: Two Models

There are two options for creating ABM programs. The first option is a disciplinary model in which a bachelor's program and a master's program in the same department or in departments of closely related disciplines establish an ABM degree. Prior to admission of any student into such a degree program, the program must be developed by the cooperative undergraduate and graduate programs and approved by the Dean of the College(s), Graduate Committee, Graduate Dean, and University Curriculum Committee.

The other option is to design a specialized plan between the student, the undergraduate department, and the graduate department for those cases in which a student is in a department that has not established a formal ABM program or in a department in one discipline and wants to take a master's degree in a different discipline. For this option, an ABM arrangement must be made between the student and the director of the graduate program granting the graduate degree and must be approved by the Department Chair of the undergraduate program, prior to and as part of the application process. The director of the graduate program must recommend admission to the Graduate School.

NOTE: The 4+1 ABM program is only available to students in departments/programs that have chosen to participate and create a 4+1 option. Students interested in a cross-department admission must first speak to, and request approval from, the Department Chair of their undergraduate program and the Graduate Program Director of the desired graduate program. The decision whether to approve a student’s request is entirely that of the two departments involved.

Admission to an ABM Program: Student eligibility requirements

NOTE: High achieving high school students successfully recruited to the 4+1 ABM program will be in an “identified” status within their undergraduate departments, and should be assigned an advisor familiar with the ABM program in their freshman year. Provided that the student maintains the necessary minimum GPA, the student’s formal admission to the 4+1 ABM program will follow the process outlined below.

• Students must meet all graduate admissions eligibility requirements. Students will not be required to prove English Language Proficiency a second time.

• Students must have completed a minimum of 60 credits, including credits earned from advanced placement and dual credit. Students must apply before completion of the undergraduate degree.

• Transfer students with a minimum of 60 credits—whether from the transfer institution alone or in combination with UND credits—and a minimum cumulative GPA of 3.0/4.0.

• Students must have a minimum cumulative grade point average (GPA) of 3.0/4.0 at UND at the time of admission into the ABM degree program

• Individual departments may impose stricter minimum admission requirements

Accelerated Bachelor’s/Master’s Application:

• A prospective student that meets the eligibility requirements above should schedule a meeting with his/her Department Chair and/or Director of the Graduate Program to develop a plan of work for his/her bachelor’s and master’s degree programs.

• Before admission to an ABM program can be finalized, students must submit, while still an undergraduate, the standard application for admission to the School of Graduate Studies, including an application, application fee, personal statement, and transcripts. Individual departments may choose to require GRE scores or other information.

• A Program of Study, signed by the applicant, the graduate advisor, and the Director of the Graduate Program must be submitted. If the student is in a specialized plan, the signature of the undergraduate advisor and undergraduate department chair are also required.

• The Program of Study must clearly indicate:

• The courses (a maximum of 12 graduate credits) that will be double counted for both bachelor’s and master’s degrees. These courses will be taken prior to completing the bachelor’s degree.
• The courses that will be taken after being accepted into the graduate program. These courses will be taken after completing the bachelor's degree.
• The graduation date for the master's degree that meets the time limit for the ABM program (i.e. completing the non-thesis master's degree within 12 months for a 4+1 program.)
• After review of the materials submitted by the Department Chair and Director of the Graduate Program to the School of Graduate Studies, a letter of acceptance (or denial) to the master's program, contingent upon meeting the ABM requirements, is issued.
• Applications accepted for admission to the Graduate Program will not be matriculated until completion of the bachelor’s degree.

Requirements for Completion of the Accelerated Bachelor's/Master's Degree Program:
• Students must complete the bachelor’s degree prior to entering the master’s program. Students in the ABM may not elect to bypass the bachelor’s degree.
• Students must maintain a cumulative GPA of 3.0/4.0 at UND to remain eligible for the ABM degree program.
• Students must maintain a cumulative GPA of 3.0/4.0 or better in the double counted graduate level courses.
• Individual departments may impose stricter minimum GPA requirements.
• No more than twelve (12) credits of graduate work may be counted toward the requirements of both degrees.
• For a 4+1 program, students must complete the master's degree within 12 months from the completion of the bachelor's degree for a non-thesis master's degree.

Continuing Eligibility for Accelerated Bachelor's/Master's Degree Programs:
• If a student completes the bachelor’s degree requirements with a cumulative GPA of less than 3.0/4.0, then he/she needs program approval to continue to pursue the ABM degree program.
• If a student becomes ineligible to participate in the ABM degree program, the Director of the Graduate Program must inform the student, the Department Chair, and the School of Graduate Studies in writing of his/her ineligibility.
• A student who is ineligible to participate in (or withdraws from) the ABM program, cannot double count any courses. The courses that were identified as double counted will remain on the undergraduate transcript only.

Exceptions to the Accelerated Bachelor’s/Master’s Degree Program Time Limits:
For those programs with a 4+1 structure, the School of Graduate Studies may grant exception to the above time limits. The Dean will consider and evaluate the specific nature of the extenuating circumstances and the compelling reasons that prompted the Director of the Graduate Program and/or the advisory committee to make the request. Requests may be submitted formally and should explain the extenuating circumstances and provide a reasonable timeline for completing the work within the limits of the extension.

Combined Bachelor's/Master's program
The Combined Bachelor's/Master’s (CBM) program allows undergraduate students at UND an opportunity to complete the requirements for both the bachelor's and master's degrees at an accelerated pace. These students may double count up to 6 graduate-level credits for both degrees. The completion of this program differs from the Accelerated Bachelor's/Master's program in that it is not constrained to the 4+1 time frame. This format may be used for thesis track or other programs that do not fit in the 4+1 structure.

Admission to a CBM program: Student eligibility requirements
• Students meet all graduate admissions eligibility requirements. Students will not be required to prove English Language Proficiency a second time.
• Students must have completed a minimum of 60 credits, including credits earned from advanced placement and dual credit. Students must apply before the completion of the undergraduate degree.
• Students must have a minimum cumulative grade point average (GPA) of 3.0/4.0 at UND at the time of admission to the program.
• Individual departments may impose stricter minimum admission requirements.

Combined Bachelor’s/Master’s Application:
• Student must submit the standard application for admission to the School of Graduate Studies, including an application, application fee, personal statement, and transcripts. Individual departments may choose to require GRE scores or other information.
• A Program of Study, signed by the applicant, the graduate advisor, and the Director of the Graduate Program must be submitted.
• The Program of Study must clearly indicate:
  • The courses (a maximum of 6 graduate credits) that will be double counted for both bachelor's and master's degrees. These courses will be taken prior to completing the bachelor's degree.
  • The courses that will be taken after being accepted into the graduate program. These courses will be taken after completing the bachelor's degree.
• After review of the materials submitted by the Department Chair and Director of the Graduate Program to the School of Graduate Studies, a letter of acceptance (or denial) to the master's program, contingent upon meeting the CBM requirements, is issued.
• Applications accepted for admission to the Graduate Program will not be matriculated until completion of the bachelor's degree.

Requirements for Completion of the Combined Bachelor's/Master's Degree Program:
• Students must complete their bachelor's degree prior to entering the master's program. Student in the CBM may not elect to bypass the bachelor's degree.
• Student must maintain a cumulative GPA of 3.0/4.0 or better in the double counted graduate level courses.
• No more than six (6) credits of graduate work may be counted toward the requirements of both degrees.
• A student who is ineligible to participate in (or withdraws from) the CBM program, cannot double count any courses. The courses that were identified as double counted will remain on the undergraduate transcript only.

Challenge Examinations
Students who believe they are eligible to establish credit for courses because of superior preparation may apply to take challenge examinations. Application should be made on a School of Graduate Studies petition form to the instructor of the course and must be approved by the student’s department and the Dean of the School of Graduate Studies before it may be submitted to the Office of the Registrar. If the application is approved, a committee of that department will administer the examination and will report a grade of either Satisfactory or Unsatisfactory. Challenge examinations will not be permitted for courses which were audited or for courses which were dropped, nor will they be permitted for a student who is not currently enrolled. Certain fees may apply.

Common Course Numbers
Course numbers for certain activities are uniform throughout the School of Graduate Studies and are not listed separately for each department:
Continuing Enrollment - 996

Students who previously have registered for all of the necessary credits of coursework, research, Scholarly Project (995), Independent Study (997), Thesis (998), or Dissertation (999) on their approved Program of Study, but who have not completed their independent study, thesis, or dissertation, must register for 996 Continuing Enrollment each additional semester or summer session they are utilizing university facilities or the time of the faculty, (i.e., laboratories, libraries, examinations, advisement, etc.). The number of credits should be determined by the advisor to reflect the proportion of time devoted by the student to academic study that term. Graduate Assistants must register for at least six (6) credits which may include a combination of formal coursework and continuing enrollment credits. Advisor verification of the appropriateness of the number of 996 credits may be required.

A master's student may enroll in two regular semesters of 6 to 9 credits of 996 and a doctoral student may enroll in four regular semesters of 6 to 9 credits of 996. A regular semester is defined as the spring or fall term.

Continuing Enrollment (996) credits will not count toward the requirements for the degree. All students must be enrolled for either 996 credits or other credits in the semester of graduation from a degree program. Students may register for both regular credits and 996 credits in a given term if all other conditions have been met. Continuing Enrollment credits may be used to define a student's enrollment status, (i.e., part-time or full-time). The fee for Continuing Enrollment (996) cannot be waived.

Enrolling in More than One Program

Students may enroll in a degree program and a certificate program at the same time and use all credits toward both programs if applicable.

Students may enroll in more than one master's level degree program at the same time. To work toward two degrees at the same time, the student must apply and be accepted to both programs; must submit a separate program of study for each degree; and must form two separate advisory committees.

Courses agreed upon by both committees may be applied to both programs. Up to 9 credits may be used for both degrees and should be indicated on the program of study for each degree.

A student enrolled in a doctoral program cannot be enrolled in another degree program at the same time.

Faculty Appointments

Faculty Advisor Appointments

Students must obtain the appointment of an advisor from the major department. The advisor must be a member of the Graduate Faculty and will be appointed by the Dean of the School of Graduate Studies upon the written recommendation of the chairperson, or designate, of the student's major department. The advisor is responsible to the department and to the School of Graduate Studies for the supervision of the student's work.

Faculty Advisory Committee Appointments

Once the advisor has been assigned, the student and the advisor must decide who will make up the Faculty Advisory Committee. Once the committee members have been selected by the advisor and the student, the "Request for New Advisor or Committee Appointment" form must be completed and forwarded to the School of Graduate Studies. The Dean of the School of Graduate Studies must approve the committee appointments.

The student along with their committee chair will select a committee member from outside the department who will serve as the Member-at-Large. The member-at-large must hold graduate faculty status. The member-at-large serves as a representative of the School of Graduate Studies and thus has the added responsibility of ensuring that the policies and procedures of the School of Graduate Studies are being followed.

Doctoral students in the College of Education and Human Development are allowed to have only four members on their committee, three members may be from within the student’s department or college and the fourth member serves as the member-at-large.

Doctor of Arts students have the option of a three or five member committee. For five member committees, the students and their advisor will select four of the five committee members for the Faculty Advisory Committee.

Assistantships

Graduate Assistants

The Graduate Assistant (GA) fulfills a unique position in the university because he/she is both a student and an employee. Graduate study and effective service as a Graduate Assistant both require extensive commitment. It is for this reason that limits are placed on the amount of effort (academic credits and teaching/research/service hours) to be spent in each role. Graduate Assistants are normally appointment as half-time assistants, but some may be appointed as quarter-time assistants.

Selection of Graduate Assistants

Applicants for GA positions must meet the eligibility requirements of the specific appointment and will not be subjected to unlawful discriminatory treatment. University educational employment policy states that there shall be no discrimination against persons because of race, religion, age, creed, color, sex, disability, sexual orientation, national origin, marital status, veterans’ status, or political belief or affiliation. North Dakota state law also prohibits discrimination in employment with regards to participation in lawful activity off University property during non-working hours, which is not in direct conflict with the essential business-related interests of the University. Interested students may apply for a GA appointment to the graduate department to which they have been admitted or to service units, which may be related to their major field.

Applications have deadlines, so check with your department 2-3 months prior to the beginning of the semester.

Graduate Teaching Assistants are selected by the department in which the student is pursuing his/her major field of study and in which the teaching assistant duties are to be performed. Graduate Research Assistants are selected by the faculty research supervisor with the concurrence of the student’s major department chairperson. Graduate Service Assistants are selected by the administrator of the service unit.

Applications for Graduate Assistantships are accepted throughout the year. Students should contact the department for information. The following general eligibility requirements are applicable to the award of and retention of any Graduate Assistantship at UND:

- Students admitted to the School of Graduate Studies and notified that they have been granted an appointment or award before they have actually received a bachelor's degree may neither register nor hold appointment or award until they have received the bachelor's degree and fulfilled all requirements for admission to the School of Graduate Studies as a degree student.
- Only degree seeking students in Approved and Provisional status may hold awards or appointments.
- Assistantship appointments will not exceed one-half time in all combinations.
- Students must maintain the credit load requirements defined in the appointment letter to retain appointments or awards.
- Students must maintain a 3.00 GPA to retain appointments or awards.
- A student may be removed from an appointment due to unsatisfactory job performance.
• Student sin good academic standing (i.e., a GPA of 3.00 or higher; 2.75 for Master of Engineering candidates) and who are performing their assigned duties satisfactorily are eligible for reappointment.
• Students who withdraw from or are dismissed from the School of Graduate Studies become immediately ineligible for and may not continue to hold an appointment or award.
• International students must meet specified language proficiency requirements to hold an assistantship.

Half-time GTAs will be expected to work up to a maximum of 20 hours per week, dependent upon departmental requirements. Quarter-time GTAs are expected to work up to 10 hours per week. For many GTAs the workload will be relatively uniform throughout the semester, but for others, the load will be uneven due to the nature of the duties.

Graduate assistantship stipends are subject to income tax and tax will be withheld. Tax will not be withheld from scholarships, traineeships, and fellowships, but the stipend may be taxable. Rulings as to the actual taxability of any specific stipend are in the hands of the Internal Revenue Service.

Policy on Outside Employment for Graduate Assistants
The School of Graduate Studies does not encourage outside employment for Graduate Student Assistants. Such employment may limit the ability of the student to make satisfactory progress towards his/her degree. Failure to make satisfactory progress towards their degree can result in coursework becoming obsolete prior to graduation, triggering the need for the additional work of revalidating obsolete coursework. Moreover, failure to make satisfactory progress may also constitute grounds for dismissal.

Graduate assistants are expected to meet the terms of their appointment in areas of teaching, research and/or service. These appointments should not exceed 100%. The Graduate School defines 100% effort for half-time assistants as 50% employment (20 hours per week) and 50% coursework (20 hours per week) or, for quarter-time assistants, as 25% employment (10 hours per week) and 75% coursework (30 hours per week). In unusual circumstances, Graduate Assistants can serve as consultants to projects or activities supported with University administered funds provided all of the following criteria are satisfied: (1) The services of the Graduate Student Consultant are outside of the realm of their Graduate Assistant responsibilities, (2) The services provided are limited in scope and do not involve prolonged teaching or research activities, (3) The combined activities, Assistant + Consulting, cannot exceed 115% effort, (4) The consulting fee is appropriate considering the qualifications of the individual to be utilized, and the nature of the services to be rendered, and (5) the overload must be sanctioned by the Graduate Program Director of the program in which the student is enrolled and approved by the School of Graduate Studies’ Dean. Notice of appointment forms are administered by the School of Graduate Studies.

Appointments of Graduate Assistants
All new graduate student employees are required to complete the E-Verify procedure prior to beginning work. All GA appointments specify a beginning date and a monthly stipend. The employee must sign the E-Verify form before the appointment effectively begins. Appointments end when the department sends a Job Data Change or Separation form to Human Resources with the “Termination” section filled out. All pay and benefits are terminated as of that date or upon graduation should graduation precede the contract termination date. Reappointment is possible, but not guaranteed, and requires satisfactory job performance and at least a 3.00 grade point average.

All GA appointments are initiated by the department using the: (1) Job Data Hire Form; (2) Position Funding Form, GTA appointments are initiated by the major department chairperson and require the approval of the Dean of the college/school in which the instruction occurs and of the Dean of the School of Graduate Studies. GRA appointments are initiated by the research supervisor and require the approval of the major department chairperson and the Dean of the School of Graduate Studies. GSA appointments are initiated by the service unit administrator and require the approval of the Dean of the School of Graduate Studies. All appointments will indicate the person to whom the student is responsible for the performance of the GA duties.

Tuition waivers are awarded by the Department and approved by both the College and the School of Graduate Studies. Students will get a letter by mail informing them of their tuition waiver award.

Formal appointment of all GAs is by virtue of a university contract issued by the Dean of the School of Graduate Studies. The student must sign to accept their contract. Students must have accepted the appointment in order for the paperwork to be further processed by the School of Graduate Studies and forwarded to Payroll.

• All GTA, GRA and GSA appointment forms must be received by the School of Graduate Studies at least two weeks prior to the start of the appointment to ensure enough processing time. Students may not start their appointments until Human Resources has completed the final approval.

The Job Data Change or Separation form is used to make changes to appointments and must come to the School of Graduate Studies for processing. The School of Graduate Studies will forward this paperwork to the Payroll Office. Terminations are processed through Human Resources.

“E-Verify electronically compares information from new employee I-9 forms with records contained in SSA and Department of Homeland Security (DHS) to verify identity and employment eligibility of new employees. Employees may not begin work without a completed I-9 form. See the Payroll website for more information about E-Verify.

Graduate Assistants' Rights and Responsibilities
“All GAs are responsible for abiding by all policies as outlined in the Code of Student Life. Additionally, they are subject to the ethical precepts and code of their academic profession, through the laws of the State of North Dakota regarding its employees, and through the University of North Dakota policies, which govern their institutional obligations. Violation of these constitutes a basis for disciplinary action in accordance with the procedures set forth herein.” (Section 1-9, Code of Student Life - http://und.edu/student-affairs/code-of-student-life/)

GAs are first and foremost graduate students, and must meet the demands of that role. GA appointments may not exceed 20 hours per week.

In their role as teachers, GTAs are members of the academic staff (but not faculty) of the University, and are accorded the rights and responsibilities of academic freedom as set forth in the “Regulations on Academic Freedom, Tenure, and Due Process” (see the NO State Board of Higher Education Policy Manual, section 605.1 - http://www.ndus.edu/makers/procedures/sbhe/default.asp?PID=53&SID=7&printable=1.

International Student Graduate Assistants
International students whose native language is not English normally will not be appointed as a GA until the completion of one year of graduate study at UND in order to provide the department an opportunity to assess the student’s ability in the use of the English language.

Graduate Teaching Assistants must be proficient English language communicators. Language proficiency will be established on the basis of the Internet Based TOEFL (iBT) by earning a score of at least 26 on the spoken section, or on the basis of the IELTS test by scoring an overall band score of 6.5. Departments may have higher minimum score requirements for awarding an assistantship. The applicant must meet all other admission requirements.

The North Dakota State Board of Higher Education policy requires all international students to purchase the health insurance approved by the institution. International students who are GAs at UND must agree to the international students to purchase the health insurance approved by the international student graduate assistants. Additionally, they are subject to the ethical precepts and code of their academic profession, through the laws of the State of North Dakota regarding its employees, and through the University of North Dakota policies, which govern their institutional obligations. Violation of these constitutes a basis for disciplinary action in accordance with the procedures set forth herein.” (Section 1-9, Code of Student Life - http://und.edu/student-affairs/code-of-student-life/)

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The North Dakota State Board of Higher Education policy requires all international students to purchase the health insurance approved by the institution. International students who are GAs at UND must agree to the deduction of the health insurance premium as a payroll deduction. The policy states that students must carry this insurance from the time of their registration at the institution until termination or completion of their studies.
Grades

Grading System

A graduate student will be allowed credit for a course only when a grade for the course has been reported to the Office of the Registrar. Grades awarded in all courses are indicative of the quality of the work done. Their significance is as follows:

Grade Honor Point Equivalent

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>Explanation</th>
<th>Grade Pts. Per Sem. Hr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>(Superior)</td>
<td>4 Honor Points</td>
</tr>
<tr>
<td>B</td>
<td>(Excellent)</td>
<td>3 Honor Points</td>
</tr>
<tr>
<td>C</td>
<td>(Acceptable)</td>
<td>2 Honor Points</td>
</tr>
<tr>
<td>D</td>
<td>(Passing, but no graduate credit awarded)</td>
<td>1 Honor Point</td>
</tr>
<tr>
<td>F</td>
<td>Failure</td>
<td>0 Honor Points</td>
</tr>
<tr>
<td>I</td>
<td>Incomplete</td>
<td></td>
</tr>
<tr>
<td>S</td>
<td>Satisfactory</td>
<td></td>
</tr>
<tr>
<td>U</td>
<td>Unsatisfactory</td>
<td></td>
</tr>
<tr>
<td>W</td>
<td>Withdrawn</td>
<td></td>
</tr>
<tr>
<td>SP</td>
<td>Satisfactory Progress (995, 997, 998 &amp; 999)</td>
<td></td>
</tr>
<tr>
<td>UP</td>
<td>Unsatisfactory Progress (995, 997, 998 &amp; 999)</td>
<td></td>
</tr>
</tbody>
</table>

Graduate Grade Point Average

A graduate student’s cumulative GPA is based on all coursework, graduate or undergraduate, taken while the student is registered in the UND School of Graduate Studies. Grades of less than “C” are not included in the number of credits accepted for a graduate degree, but they are counted in determining the cumulative GPA.

Credits and grades for courses accepted in transfer, or courses graded on a Satisfactory-Unsatisfactory basis are not counted in determining the GPA.

Graduate students do not have the option of receiving a grade. Graduate students do not have the option of electing S/U grading in either graduate or undergraduate courses.

Incomplete Grades

It is expected that students will complete all requirements for a course during the time frame of the course. For reasons beyond a student’s control, and upon request by the student or on behalf of the student, an incomplete grade may be assigned by the instructor when there is reasonable certainty the student will successfully complete the course without retaking it. The mark “I,” Incomplete, will be assigned only to the student who has been in attendance and has done satisfactory work up to a time within four weeks of the close of the semester, including the examination period, and whose work is incomplete for reasons satisfactory to his or her instructor. Incompletes are entered on the final grade report. Incompletes are entered on the final grade report. The instructor of the course and the Dean of the School of Graduate Studies must approve and sign the Report of Incomplete Grade form for any extension or incomplete beyond the default date listed in the UND Schedule of Courses. It is the student’s responsibility to contact their instructor about an incomplete grade posted on the final grade report.

In Progress Grades

A grade of “SP,” Satisfactory Progress or “UP,” Unsatisfactory Progress may be assigned to Scholarly Project (995), Thesis (998), Dissertation (999), Independent Study (997), Readings for Comprehensive Examination (ENG 591 Readings for Ph.D. Comprehensive Examinations), Professional Exhibition (ART 599 Professional Exhibition) or Research (leading to the thesis or dissertation). The “SP” or “UP” grade for these activities, which may span several semesters, need not be replaced until the conclusion of the activity, usually a student’s final semester. Grades of “SP” or “UP” are not calculated in term or cumulative GPA values and will be expunged from the record upon submission of final grades for the course.

Grade Changes

Submitted grades, except for grades of incomplete, are final and may only be changed to correct an error. Grades may not be changed by additional work or submitting additional materials. Students should report any error to their instructor within 90 days of receipt of the grade. The instructor must file a change of grade form with the Registrar signed by the instructor, the department chair, and the dean of the course (Note: For courses receiving graduate credit, the School of Graduate Studies Dean is the dean of the course). Reasons for the change must be fully explained and justified.

Repetition of Courses

All courses taken by graduate students, for which a grade of D, F, or U was received, may be repeated once for credit, with only the second grade to count in the grade point average. This option does not apply to a student who has been dismissed. Courses with grades of C or better may not be repeated without the written approval of the Dean of the School of Graduate Studies. It is up to the student to notify the School of Graduate Studies when a course has been retaken so that the grade point average can be recalculated. Courses taken as an undergraduate may not be taken again as a graduate student and used on a program of study.

Graduate Cooperative Education

Some departments offer Graduate Cooperative Education. The course must meet the following minimum requirements set by the Graduate Committee:

- The student must be in Approved status and in good academic standing (minimum 3.00 GPA).
- The student must have completed a minimum of 9 credits of the Program of Study.
- The nature of the Cooperative Experience must be relevant to the student’s approved Program of Study.
- The student must have the approval of the department, i.e., department chair or graduate director, and of his/her advisor before the co-op begins.
- The student must have the approval of the School of Graduate Studies dean prior to beginning the Cooperative Education experience.
- Proper work experience on campus may be acceptable, but not employment in the department granting the co-op credit.
- Credit will not be allowed for current career track positions.
Graduate Credit

Graduate credit may be earned only by students enrolled in the School of Graduate Studies and in courses listed in the Graduate section of the Academic Catalog. Graduate level courses outside of a student’s major program are eligible for use in the major or minor of any Program of Study for a Graduate Degree, subject to the approval of the student’s advisor or Faculty Advisory Committee and the Dean of the School of Graduate Studies. All UND courses numbered 300 and above may be applied to the cognate part of a Program of Study. At least one-half of the credits for all degrees must be in courses numbered 500 or higher. Graduate credit will not be given for courses that are not approved for graduate credit at the time that they are taken. Courses taken for undergraduate credit cannot be retaken for graduate credit.

Graduate Credit for Undergraduate Courses

A limited number of upper level undergraduate courses may be approved for graduate credit with approval of the Graduate Committee and University Curriculum Committee. It is understood that the student will be required to do additional work of greater complexity, over and above that typically required for undergraduates.

NOTE: The 300 or 400 level courses listed in this section of the catalog were approved by the Graduate Committee for graduate credit on the basis that the student be required to do additional work, generally of an independent nature.

Graduate Work by Undergraduates

Graduate courses normally are open only to graduate students. An undergraduate senior at UND may enroll in graduate courses (500 level) for undergraduate credit. All undergraduate students must have the permission of the instructor and School of Graduate Studies Dean to take a graduate course. Requests for approval must be submitted on the “Petition for Graduate Credit as an Undergraduate Student,” which is available from the School of Graduate Studies.

Students classified as Seniors may petition the Dean of the School of Graduate Studies requesting permission to enroll in graduate level courses for graduate credit. For this petition to be considered, the following requirements must be met:

1. The graduate credits being petitioned are not needed to complete requirements for the baccalaureate degree.
2. The graduate course(s) are listed in the current School of Graduate Studies Catalog.
3. The petition is filed by the last day to add a full-term course.
4. The student has senior standing (90 credits).
5. The student’s load is not more than 16 credits in a regular semester or 8 credits in a summer session.
6. The student’s overall GPA is at least 3.00.
7. The course(s) are not taken for S/U grading.

Graduation-Application for Degree or Diploma

Students who expect to receive a degree must complete the online graduation application by the deadline noted in the academic calendar. All graduate students must have been advanced to candidacy the semester preceding the semester in which they expect to graduate.

After the student applies for the degree, the School of Graduate Studies checks the academic record to ensure that the student is eligible to graduate. A new application must be filed if the student fails to graduate. Students applying to earn a master’s or doctoral degree must be registered for the term in which they expect to receive their degree. Students applying to earn a certificate are not required to be registered for the term in which they expect to receive their certificate.

CANDIDACY FOR DEGREES

Admission to the School of Graduate Studies does not imply admission to candidacy for an advanced degree. The rights to candidacy can be earned only by demonstrating the preparation for and ability to pursue graduate work and by fulfilling requirements prerequisite to candidacy. Those requirements are described in detail for each degree. Advancement to candidacy does imply that the student has been judged by the advisory committee and the dean to have satisfactorily completed much of the formal coursework and examination requirements and to be fully qualified to pursue the remaining, usually more independent, portion of the degree work.

Leave of Absence from Graduate Study

Students who wish to take a leave of absence from their program must notify their graduate program and the School of Graduate Studies by requesting a leave of absence on the School of Graduate Studies the Graduate Readmission or Leave of Absence form available on the School of Graduate Studies Web page. The form must be submitted in advance of the leave. Degree and certificate seeking students who do not submit a leave of absence will be required to apply for readmission to the School of Graduate Studies. Applications for readmission will be reviewed by the program and Graduate Dean. Students may be denied readmission based on review of their prior progress and their application for readmission.

Maximum and Minimum Academic Load

A full course load for a graduate student is 9 credit hours in a semester, including summer session. A graduate student may carry no more than 15 credit hours per semester or 15 credits in a summer session without permission of the student’s advisor. Graduate Assistants must carry at least 6 credits each semester, including a summer session.

Maximum Period Allowed and Revalidation of Courses

Maximum Period Allowed for Graduate Programs and Revalidation of Courses

Graduate courses more than seven years old are considered obsolete and may not be counted to fulfill course requirements for an advanced degree program. Programs of study more than seven years old are also obsolete.

Obsolete UND graduate courses may be revalidated and may be counted toward an advanced degree on the recommendation of the student’s Faculty Advisory Committee and with the consent of the Dean of the School of Graduate Studies. In no case will more than one-half of a program of study be accepted for revalidation. Revalidation of an obsolete graduate course can be approved only if it can be demonstrated that a student’s knowledge of the subject matter of the course is current. Oral and/or written examination on the subject matter of the course normally is required. Prior approval of the dean must be obtained for the proposed revalidation on the form titled “Revalidation of UND Graduate Course.”
Graduate work from another institution which is obsolete may not be revalidated for a UND graduate degree. Work which was part of a completed prerequisite graduate degree program does not become obsolete.

Minors and Cognates

Some degree programs require or permit academic work outside of the major field of study, which may be called a minor, (at least nine credit hours), or a cognate, (at least six credit hours). Credit hours earned towards a previously awarded degree or certificate cannot apply to a minor or cognate.

A minor is a concentrated study in a specific supporting field at the graduate level. A minor must be titled and identified on the student’s program of study and be approved by a Graduate Faculty member of the minor department/program. The minor will be listed on the student’s transcript, only if the minor has been approved by the State Board of Higher Education. Only courses approved for graduate credit may be included in a minor. If the student is doing a non-thesis option, the Graduate Director of the minor department must sign and approve the program of study. For students writing a thesis or dissertation, one of the student’s advisory committee members must be from the minor department.

A cognate is a selection of courses providing broad support to the major. All courses numbered 300 or above listed in this catalog, including those offered by departments or fields that do not offer graduate courses or graduate degrees, may be included in the cognate. Exceptions may apply to language courses where lower level courses may be allowed to fulfill cognate requirements. (Note: advanced approval of the program and graduate dean is required.) Courses should be taken in two or three departments or fields. A cognate area will not be titled and will not be listed on a student’s transcript. Courses from the student’s major cannot be used as a cognate area. Students wishing to pursue a cognate must fulfill all degree requirements for their program. Courses that are not approved for graduate credit cannot count towards the degree requirements, but may satisfy the cognate requirements.

NOTE: When a graduate student elects to take a 300 or 400 level course that has been approved for graduate credit or a 300 or 400 level course as part of their cognate, it is understood that the student will be required to do additional work of greater complexity, over and above that typically required of undergraduates. Usually, such work is of an independent nature.

Program of Study

Students must submit a Program of Study for approval by the Dean of the School of Graduate Studies which will have been developed in consultation with the advisor and signed by the departmental chairperson (or designee). If a minor is declared, the Program of Study also must be signed by the chairperson of the minor department. The Program of Study should be developed early in the second semester and submitted to the School of Graduate Studies.

The Program of Study is a listing of the courses and credits needed to meet the requirements for the degree and major (area of concentration). In addition to a major, some students elect to obtain a minor (a concentrated study in a specific supporting field) or to take courses in a cognate area (a selection of courses providing broad support to the major). The courses selected for the major, minor, and/or cognate must be included on the Program of Study. It is the student’s responsibility to know what the course and credit requirements are for their department. The student should consult with their advisor or the Graduate Director of their department when preparing their Program of Study. The Program of Study will include academic coursework in one major department, as well as coursework from related departments, i.e., a minor or cognate. At least one-half of the work must be in the major field. If transfer credits are to be included on the Program of Study, make sure they can be applied to the degree. Transfer courses must be listed on the Program of Study exactly as they appear on the transcript with the exception that quarter credits need to be converted into semester credits. For detailed information, refer to the Transfer of Graduate Credits (p. 318) section in the Graduate Catalog.

Nine graduate non-degree credits may be applied to the degree if they are approved on the program of study. Graduate courses more than seven years old are considered obsolete and may not be included on the program of study. However, obsolete courses may be revalidated by submitting a revalidation plan using the form on the School of Graduate Studies website. A revalidation plan must be submitted to the Dean before the revalidation process is undertaken. The revalidation plan must be attached to the Program of Study for approval if the course(s) are to be applied to the degree.

Courses listed on the Program of Study should be grouped into appropriate sections and supply a title for each one: major, minor, cognate, foundations, etc. The number of required credits should be included in the appropriate column, for the total program, the major, the minor, the cognate, and the foundations areas.

All members of the student’s Advisory Committee must sign the Program of study. Some departments may allow the Program of Study to be submitted prior to selecting a committee. In these cases, only the advisor must sign the Program of Study. Contact the graduate program director with questions about the program’s policy. The graduate program director is also required to sign all Program of Study forms prior to submission to the School of Graduate Studies. Changes to the Program of Study can be made by completing the “Changes to a Program of Study” form found on the School of Graduate Studies Web page. After the advisor signs the form, it should be submitted to the School of Graduate Studies for the Dean’s approval. Do not submit a new program of study, unless there are major changes.

Registration Policies and Procedures

School of Graduate Studies Requirements

Any student who holds a baccalaureate degree and has established status as a Degree, Non-Degree, or Certificate student is eligible to enroll in a graduate course, i.e., a course numbered 500 or higher.

Enrollment in certain courses may be limited to degree seeking students in the specific program in which the course is offered. In some instances, students in Non-Degree status may need to seek approval from the department and/or instructor of the course.

Registration and fee payment procedures are outlined by the Office of the Registrar and published in the Schedule of Classes. Registration is complete only upon payment of tuition and fees. Registration may be cancelled by the Business Office if tuition and fees are not paid.

It is strongly recommended that students consult with their advisor before registering for classes. New students are assigned a temporary advisor at the time of admission. Only work taken as a registered graduate student may be credited toward a graduate degree. Approval of the School of Graduate Studies is required and must occur prior to the time that the class is taken. Graduate credit will not be granted retroactively.

The number of credits for which a student may register is subject to certain limits. Registrations not in compliance with University, School of Graduate Studies, and departmental policies are subject to cancellation by the Dean of the School of Graduate Studies.

Research

Research and Scholarship at UND

The UND community of faculty, students and staff are committed to the advancement of knowledge through research and scholarship, and to the advancement of the arts and culture through creative endeavors. In 2017, the University embarked on an ambitious plan to join the list of the highest ranked research universities in the nation (Carnegie R1 – Doctoral University, Highest Research Activity). This plan seeks to focus the research of all faculty and students on several Grand Challenges including energy, environmental sustainability, human health, rural communities, autonomous systems including but not limited to Unmanned Aircraft Systems (UAS) and Big Data. These broad, multifaceted and globally important Grand Challenges will be met at UND through the efforts of faculty and students across all academic disciplines. It is expected that the impact of these Grand Challenge efforts on the experience of our graduate students will be life changing both during their studies and in their subsequent professional lives. As well as immersion in their disciplinary studies, students will have the opportunity to learn the important skills of collaboration, cooperation across disciplines, and public presentation of
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UND School of Graduate Studies
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Office of the Vice President for Research & Economic Development
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The Office of Sponsored Programs (OSP) provides information and assistance on funding sources and oversees compliance with all federal, state, and University regulations for conducting research. OSP accomplishes this by developing, implementing, and monitoring policies related to sponsored programs, such as those for the Institutional Review Board, Animal Use and Care Committee, Institutional Biosafety Committee, Radiation Safety and Hazardous Materials Committee, Conflict of Interest Committee, and financial administration of grants and contracts. OSP prepares agreements and contracts, and acts as the University’s representative to all sponsors. Its roles and responsibilities include: to assist faculty/staff in locating potential funding sources; to provide information regarding sponsor regulations and proposal preparation; to conduct administrative reviews of proposals; to assure compliance with University and sponsor regulations concerning conflict of interest, export controls, research involving animals, research involving human subjects, and misconduct in science or creative activities. Students wishing more information about sponsored research and compliance should contact the OSP.

The Office of Corporate Engagement & Commercialization (CE&C) is responsible for developing and managing UND research and intellectual property relationships with the commercial sector and supporting the University’s economic development priorities. Based upon State Board of Higher Education policy, UND has detailed policies regarding intellectual property, patents, and copyrights. CE&C is responsible for the protection and commercialization of University research innovations including: aerospace sciences, Unmanned Aerial Systems (UAS); computer sciences; medicine and health sciences; and engineering and physical sciences. CE&C will provide services to draft, file, and prosecute patent applications for UND inventions. CE&C defines and market technology portfolios of inventions to promote new business ventures and build business alliances to accelerate commercialization of valuable UND research output including transition of inventions to the marketplace. Services include fostering research relationships with commercial partners, performing analysis of patentability, value, and marketability to identify strategic direction as a licensing, joint venture, or spin-off company opportunity. CE&C serves as a resource for drafting and negotiating legal agreements, such as confidentiality, material transfer, and licensing agreements, with business partners. CE&C also works closely with the Technology Accelerator, a facility for growing technology companies on the west edge of campus. Students wishing more information about intellectual property rights should contact the CE&C.

Residence Requirements
Residence Requirements
Some graduate degree programs, especially those with a significant research/ creative component, require that students spend a minimum period of time in residence during their course of study. The purpose of residence is to provide an opportunity for sustained and concentrated intellectual effort, to provide for immersion in a research environment, and to permit extensive interaction with fellow students and faculty of the major department.

In order to meet a residence requirement, a student must devote full time to academic study and must be registered for at least nine credits in a semester or six credits in a summer session, or be a graduate assistant.

The Residence Requirements are stipulated for each graduate degree program in this catalog. A year of residence requires two consecutive semesters of residence. Two years of residence requires four consecutive semesters of residence or three semesters and two summer sessions, all without interruption.

Any exceptions to the policies stated above must be approved in advance by the student’s advisory committee, the student’s department, and the Dean of the School of Graduate Studies.

School of Graduate Studies Standards and Professional Conduct Policy
This Policy establishes specific standards of professional conduct for students enrolled in the University of North Dakota School of Graduate Studies ("graduate students"). The School of Graduate Studies considers these professional standards to be part of its academic curriculum. The standards contained within this policy are in addition to a set of university-wide policies found in the Code of Student Life that are applicable to all students at the University of North Dakota ("UND"). Alleged violations of the standards of professional conduct established by this policy are addressed using procedures established by The School of Graduate Studies and outlined below.

Graduate students are expected to know all applicable University policies and degree program requirements. Students are encouraged to consult with faculty and staff in these programs should they have questions about specific departmental requirements.

UND expects and will require the cooperation of all its students in developing and maintaining high standards of scholarship and conduct. By accepting admission to a program in the School of Graduate Studies, graduate students
indicate their understanding, acceptance, and agreement to be governed by these standards of professional conduct. Additionally, graduate students acknowledge the right of the University to take such disciplinary action, including but not limited to suspension or dismissal, as may be deemed appropriate by the School of Graduate Studies for failure to abide by such standards.

The Graduate Environment: An Overview

It is the joint responsibility of faculty and graduate students to work together to foster an environment of professional and ethical conduct. Such an environment encourages freedom of inquiry, fosters mutual respect, and demands high standards of personal and professional integrity. Each party in the graduate process, including the faculty, graduate students, the graduate department or program, and the School of Graduate Studies, has particular responsibilities in ensuring the creation and maintenance of this environment.

The School of Graduate Studies

In its efforts to ensure quality in all aspects of graduate education, the School of Graduate Studies will provide clear and appropriate avenues of redress wherever particular faculty or student experiences fall short of the standards and expectations articulated in this document.

Graduate Departments, Programs, and Graduate Faculty

Graduate Departments/Programs and Graduate Faculty will provide, at appropriate stages, constructive reports and feedback on the progress of graduate students toward their chosen degree. Graduate programs and faculty are also responsible for ensuring a collegial learning environment in which faculty and students work collaboratively, respectfully, and professionally.

Professional Conduct

Graduate students are at all times expected to conduct themselves in a professional and respectful manner when interacting with fellow students, faculty, and the School of Graduate Studies staff. Graduate students are expected to arrive on time, follow deadlines, complete the coursework that is assigned to them, and meet standards of professional behavior, including, but not limited to: being present, as required, to meet the academic and research expectations of the school or department; communicating in a timely, respectful and professional manner; complying with institutional policies and procedures; and participating appropriately in the program’s community.

Guidelines for Addressing Graduate Student Professional Misconduct

In order to protect and promote the ethical pursuit of knowledge, the School of Graduate Studies will enforce student accountability in all cases related to professionalism according to these Guidelines. Students who do not comply with the School of Graduate Studies standards of professional conduct as outlined in this Policy will be subject to the process outlined herein, which may result in disciplinary action or penalty determined by the Dean of the School of Graduate Studies or designee (hereinafter referred to as Graduate Dean).

Dismissal or Discipline for Professional Misconduct: Procedure

The principal conditions for continued registration of a graduate student are the timely and satisfactory completion of the university, department, and program requirements for the degree, fulfillment of minimum progress requirements, and meeting standards of professional behavior. If a graduate student is found in violation of the School of Graduate Studies Standards of Professional Conduct, the graduate student may be subject to:

1. Incident recorded in graduate student’s academic file
2. Revocation of assistantship and tuition support, and/or ineligibility for future School of Graduate Studies scholarships or waivers
3. Revocation of right to complete course evaluation (SELF)
4. Loss of course or research credit
5. Suspension or dismissal from the program
6. Other consequences as determined to be appropriate by the department, program or Graduate Dean.

Faculty will initiate appropriate measures to monitor and report acts of professional misconduct for violation enforcement. A violation may be treated as an academic matter or disciplinary matter. Violations treated as academic matters may result in discipline, up to and including removal from the School of Graduate Studies. Alternatively, a faculty member may refer the case as a disciplinary matter to the Office of Student Rights and Responsibilities under the UND Code of Student Life. Examples of violations that may be referred to as disciplinary matters are repeated or egregious forms of academic dishonesty or behavior that is a violation of the UND code of Student Life.

In the event that a faculty member elects to treat a matter of professional misconduct as an academic matter, the faculty member will follow this process:

1. Where possible and as early as possible, notify the graduate student, the graduate program director, and any relevant program faculty committee, in writing, of the situation and deficiency; providing a detailed explanation of the reason for the notification and all relevant information. At this point, the graduate program director will:
2. Allow the graduate student(s) to respond to the alleged professional misconduct and consider any relevant information or extenuating circumstances provided by the graduate student(s);
3. Decide the question of discipline and/or dismissal and communicate the decision to the graduate student(s) and the Dean of the School of Graduate Studies in writing. Such decision must include:
4. a summary of any discussions and information considered;
5. a notification that the graduate student(s) has a right to examine their student file, if requested;
6. information about the graduate student’s right to grieve the decision under appropriate department and/or college grievance policy and procedures and/or the School of Graduate Studies’ grievance policy and procedures.

Students who wish to grieve an academic decision made by the graduate program regarding an allegation of professional misconduct shall commence by discussion between the student and the graduate program director who communicated the decision. In the absence of resolution by such discussion, the grievance may be advanced by the student beginning at the next level and continuing as necessary through the persons/units/committees in the following sequence: a) advisor or advisory committee; b) the Department Chairperson; c) the College Dean; d) the Dean of the School of Graduate Studies.

The final decisions of the Dean of the School of Graduate Studies may be appealed according to the “Grievance Policy” section of the School of Graduate Studies Policies and Procedures. Please note that the most current version of this policy is in the School of Graduate Studies section of the Academic Catalog and that the most recent version of this policy supersedes earlier versions.

Thesis/Independent Study/Scholarly Project or Dissertation

Thesis

The student must submit a thesis to the School of Graduate Studies as partial fulfillment of the requirements for the degree. Credit will be given for the writing of the thesis and for the research completed and incorporated into the thesis. The amount of credit may vary from four to nine credits and will be determined by the major department. The thesis, prepared under the guidance of the student’s faculty advisor, must show sound method and demonstrate scholarly. The School of Graduate Studies provides a style manual that may be used, but the faculty advisory committee may select any appropriate style guide or manual to follow.

The topic for a thesis must be approved by the student’s Faculty Advisory Committee. Approval is effected by the student completing a form entitled “Topic Proposal of Thesis,” then submitting the proposal to the Advisory Committee and the Dean of the School of Graduate Studies for their approval. The approved proposal is then filed in the School of Graduate Studies to
become part of the student’s record. The proposal must be approved the semester prior to the semester in which the student expects to graduate, and must be filed in the School of Graduate Studies before a student is advanced to candidacy for a master’s degree.

A preliminary draft of the thesis must be presented to the Advisory Committee sufficiently in advance of the preliminary approval deadline that the Advisory Committee may thoroughly evaluate the thesis. After the necessary corrections and changes have been made, the student should secure the committee members’ signatures on a form entitled Preliminary Approval of Theses and Dissertations, available on the School of Graduate Studies’ website, and file this form in the School of Graduate Studies. The Preliminary Approval, which indicates to the student that no major changes will be required in the final copy of the thesis, must be in the School of Graduate Studies no later than the deadline specified in the Academic Calendar, or the student will not be permitted to graduate that semester.

Copies of the thesis in its final form must be prepared and presented to the student’s Faculty Advisory Committee in time that they may thoroughly read the thesis prior to the final examination. When the final version of the thesis has been approved by the Committee, it must be submitted electronically to ProQuest for publication and receive the signed approval of the Dean of the School of Graduate Studies by the deadline announced in the Academic Calendar (usually two weeks prior to commencement).

The final copy of the thesis will be printed and bound by ProQuest and cataloged in the University Library. The student may be required to submit additional copies to the department or faculty committee members.

**Independent Study or Scholarly Project**

The independent study or scholarly project is designed to require the student independently to investigate a topic related to the major field of study. The study need not be an original contribution to knowledge but may be a presentation, analysis, and discussion of information and ideas already in the literature of the field. The requirement is to ensure that a student can investigate a topic and organize a scholarly report on the investigation.

Independent studies are single author works; scholarly projects may be team projects.

The topic for an independent study or scholarly project must be approved by the student’s advisor. Approval is effected by the student completing a form entitled Topic Proposal of Independent Study, available from the School of Graduate Studies and on the School of Graduate Studies website, then submitting the proposal to the advisor for approval. The proposal must be approved no later than the semester or prior to the one in which the student expects to graduate, and must be filed in the School of Graduate Studies to become part of the record before a student is advanced to candidacy for a master’s degree.

Students must prepare and secure the advisor’s approval of an independent study or scholarly project report. Copies must be accepted by the advisor who will certify completion by submission of the Final Report on Candidate to the School of Graduate Studies by the deadline specified in the Academic Calendar and submit a grade for 997-Independent Study or 995-Scholarly Project to the Office of the Registrar. The number of copies required will be specified by the department.

**Dissertation**

Each candidate for the Doctoral degree must submit a dissertation to the School of Graduate Studies in partial fulfillment of the requirements for the degree. The dissertation is prepared with the guidance and advice of the student’s faculty advisor. The School of Graduate Studies provides a style manual that may be used, but the faculty advisory committee may select any appropriate style guide or manual to follow.

The topic for the dissertation must be approved in advance by the student’s Faculty Advisory Committee. Approval is effected by the student completing a form titled Topic Proposal of Dissertation, available on the School of Graduate Studies website, then submitting the proposal to the committee and to the Dean of the School of Graduate Studies for approval. The approved proposal must be filed in the School of Graduate Studies for approval. The proposal should be approved the semester before the degree is expected, but it must be completed before advancement to candidacy.

The draft of the dissertation should be presented to the Faculty Advisory Committee sufficiently in advance of the Preliminary Approval deadline that a thorough evaluation may be effected by the entire committee. The committee must be able to read the draft, suggest corrections and changes, and the student must be able to make the corrections, all in time for the committee to indicate its approval of the draft by signing a form titled Preliminary Approval of Dissertation. The student must deposit the approval form in the School of Graduate Studies by the deadline specified in the academic calendar (usually four weeks prior to commencement). The Preliminary Approval assures the student that no major changes will be required in the final copy of the dissertation. Copies of the dissertation in its final form must be presented to the Faculty Advisory Committee in time that they may thoroughly read the dissertation prior to the final examination.

When the final version of the dissertation has been approved by the Committee, it must be submitted electronically to ProQuest for publication in time to receive the approval of the Dean of the School of Graduate Studies by the deadline specified in the Academic Calendar (usually two weeks prior to commencement). The final copy of the dissertation will be printed and bound by ProQuest and cataloged in the University Library. The student may be required to submit additional copies to the department or faculty committee members.

**Thesis/Dissertation Defense**

The student’s academic advisor must complete the “Notice of Defense” form and secure the necessary signatures. This Notice of Defense along with the Preliminary Approval (if not previously submitted) must be received at the School of Graduate Studies two weeks in advance of your defense. The candidate and committee members must be physically present at the defense unless the program has developed clear guidelines and instructions by which the candidate or committee members may participate at a distance using real-time synchronous technology. Any technology used to facilitate distance participation by the candidate or committee members must be supported by UND, capable of real-time audio and video, compatible with “presentation” software, such as PowerPoint, and must be open and accessible to the candidate, committee and non-committee members.

What is included in the defense varies from department to department. Some departments have students present their dissertation research in a presentation with a question/answer period following. Your advisor should be able to help you prepare. Your examination will be conducted by your Faculty Advisory Committee. It is also open to the other members of the Graduate Faculty and the academic community.

**Transfer of Graduate Credits**

A limited amount of graduate work completed at a regionally accredited North American institution prior to, or after matriculation in the School of Graduate Studies at UND, may be applied toward a graduate degree at the University of North Dakota. Graduate work is considered for transfer only on an individual basis and only after the student has completed satisfactory work in residence at UND. Those transfer credits approved by the student’s advisory committee and the Dean of the School of Graduate Studies are included in the program of study for the UND graduate degree and only those transfer credits will be recorded on the UND transcript. Students requesting to transfer credits from an international institution will be required to provide a WES credential evaluation.

The basic purpose of the transfer policies is to ensure that transferred work is of comparable content, level, timeliness, and quality to that which would be taken at UND and included on the program of study for the degree. The following policies are generally applicable to the acceptance of the graduate work for transfer to UND:

- The work must have been taken at an accredited North American institution.
- The student must have been enrolled as a Graduate Student.
- The work must have received graduate credit at the institution where it was earned.
- The student must have earned a grade of B or better.
- The work must be less than seven years old at the time the UND degree is awarded with the exception of work that was part of a completed prerequisite degree.
• The amount of transfer credit that will be accepted toward the master’s degree is one-fourth (usually eight semester credits) of the credit hours required for the degree.
• The work credited toward a completed master’s degree may be accepted for a specialist’s diploma or doctoral degree.
• Work beyond the master’s degree must be post-master’s level and from an institution that offers post-master’s degrees in the discipline.
• Work beyond the master’s degree from an institution offering only master’s level work in the discipline may be applied to the minor or cognate areas.

For Master’s degrees requiring up to 36 credits, up to nine credits of transfer credit will be accepted toward the degree. For Master’s degree requiring over 36 credits, one-fourth of the credit hours for the degree may be transferred.

For the Ph.D., only 30 credits may be transferred beyond the credits allowed for the master’s degree, i.e., a total of 60 credits, if the other institution offers Ph.D. level courses in the same discipline.

For the Specialist Diploma, only 15 credit hours will be transferred beyond the credits allowed for the master’s degree, i.e., a total of 45 credit hours.

For the D.N.P., if no pre-requisite master’s degree has been earned, the amount of transfer credits that will be accepted toward the doctoral degree is a maximum of 21 credits.

Courses transferred from another university to a certificate program must meet the conditions of the transfer policy as stated in the "Transfer of Graduate Credits" in the UND Graduate Catalog.

**UND Student Health Service Requirements**

**Required Immunizations**

The North Dakota University System (http://www.ndus.edu/makers/procedures/sbhe/default.asp?PID=74&SID=6) policy requires all students to be vaccinated with 2 doses of measles, mumps, and rubella. All newly admitted students ages 21 and younger must provide documentation of a meningitis vaccination given after the 16th birthday. Students are also required to complete the TB (Tuberculosis) Screening Form.

Documentation must be provided by August 1st for Fall Semester, January 1st for Spring Semester, and May 1st for Summer Semester. Failure to comply with the immunization requirements will result in a hold on your account restricting you from registering for the following semester.

Immunization documentation may be submitted via the following options:

Mandatory Immunization and TB screening Forms/Instructions (http://und.edu/health-wellness/student-health_/files/docs/instructions-immunizations-tiform.pdf). This form may be printed off, filled out and returned with the appropriate immunization documentation to Student Health Services, 100 McCannel Hall, Stop 9038, Grand Forks, ND 58202 or faxed to 701-777-4835.

OR:

If you have claimed your UND account, you may access our patient portal at myhealth.und.edu to enter your immunizations and upload immunization information electronically. (Use your UND user name and password to log in)

If you have questions, contact UND Student Health Services at 701.777.4500 or 1.800.CALL.UND, ext. 4500.

**Exemptions**

• Students who are taking courses off campus, such as on-line, correspondence, etc.
• Immunization contraindicated by medical condition
• Student has had one immunization and agrees to have second immunization within one month
• A student’s beliefs preclude participation in an immunization program

If you have medical or religious reasons for not receiving the required immunizations, please complete the Medical/Conscientious Exemption section of the Mandatory Immunization and TB Screening Form. A physician’s signature is required for a Medical Exemption. PLEASE NOTE: By requesting the exemption to immunization, the student may be excluded from all campus activities, including classes, in the event that the North Dakota Department of Health declares the existence of a measles, mumps, rubella or meningitis outbreak at the University. This exclusion shall remain in effect for such time as determined by the North Dakota Department of Health.

**Vaccines**

In addition to MMR, there is a comprehensive menu of vaccines available at Student Health Services, almost always at a reduced fee. While some vaccines are part of the basic protocol for general health, others are more specific for other purposes, such as foreign travel.

The following vaccines are available:

- Influenza (flu) shots
- Gardasil (HPV)
- Hepatitis A
- Hepatitis B
- Twinrix (combination of Hepatitis A and B)
- Tetanus/diphtheria (Td)
- Tdap (Tetanus, diphtheria and pertussis)
- Pneumovax (PPV23)
- Mantoux (Tuberculosis test)
- Polio
- Yellow Fever
- Chicken Pox (Varicella)
- Rabies
- Typhoid
- Meningitis (MCV4)*
- Japanese Encephalitis

All vaccinations are done by appointment at Student Health Services.

**Withdrawal from the University**

A student wishing to withdraw from the University before the end of a semester must begin the withdrawal process by submitting a completed Withdrawal Form to the Office of the Registrar. Failure to do so will result in a grade of F in all classes and no refund of fees. If a student would like to completely withdraw from a degree program, he or she must complete a School of Graduate Studies Withdrawal Form available on the School of Graduate Studies website.

**Workshops**

Graduate level workshops are short-term organized learning experiences which provide for active, hands-on participation or for concentrated study on a specialized topic. Students register as Continuing Education students and do not have to be formally admitted to the School of Graduate Studies.

Graduate level workshops are offered by the graduate departments under the course number “900-Graduate Workshop.” For each workshop registration, a transcript entry will be made showing the title, credit, and grade for the workshop.

Since graduate level workshops are not designed for the purpose of being a part of a graduate degree program, their credit shall not be applied toward graduate degree requirements.

**Research**

**Research and Scholarship at UND**

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Academic Grievance

Guidelines for Graduate Student Grievance Hearings, University of North Dakota

The Graduate Committee hears grievances brought by graduate students seeking redress on academic decisions made by the Graduate Dean. This document sets out the procedures for the consideration and hearing of student grievances.

I. PRINCIPLES UNDERLYING STUDENT GRIEVANCE HEARINGS

1. The procedures should be fair and transparent;
2. Student grievances should be dealt with within a reasonable time, and decisions should not be rushed, and all information relevant to reaching a fair decision should be taken into consideration;
3. A grievant may be accompanied by an advisor, who may be a lawyer, when appearing at any grievance hearing;
4. The principal parties should have equal access to relevant information and documentation;
5. An individual’s privacy and confidentiality should be respected, subject to the need for an open and fair investigation;
6. Procedures should ensure that, where a grievance is upheld, appropriate action is taken;
7. Members of a student grievance hearing panel should disclose any professional or personal relationship they may have with any of the parties;
8. Members of a student grievance hearing panel should recuse themselves if they have a conflict of interest and/or may have difficulty objectively reviewing the facts and information presented.

II. SCHOOL OF GRADUATE STUDIES STUDENT GRIEVANCE DOMAIN AND PROCEDURES

1. The Graduate Committee will review written student grievances concerning academic decisions made by the Graduate Dean.
2. The Graduate Committee does not review the substance of grievances of course grades, allegations of academic dishonesty or scientific misconduct, matters relating to employment or assistantships, or allegations of discrimination. If it has been determined by the relevant administrators...
or committees that situations such as these have occurred, the Graduate Committee may review whether actions of the Graduate Dean were made on sufficient grounds.

a. Grade grievances are subject to review by the College in which the course is offered.

b. Allegations of academic dishonesty, scientific misconduct, and discrimination are subject to review by the College in which the academic dishonesty, scientific misconduct, or discrimination is said to have taken place.

c. Definitions:

- "Graduate Dean" refers to the Dean of the School of Graduate Studies or his or her designee.
- "Day" means normal university school day when regular classes or examinations are held, not including Saturday and Sunday.
- A Graduate Student Grievance Hearing Panel may be convened during the summer if all the parties are available, and sufficient members of a Graduate Student Grievance Hearing Panel can be available.
- "Grievance Hearing" is the formal meeting in which the student and other principal parties present information regarding the grievance, and the course of events that led to the filing of the grievance.
- "Grievance Hearing Panel," hereby known as the Panel, is the group of Graduate Committee faculty and student designee who are chosen to be present at a grievance hearing.
- "Grievant" is the student filing the grievance.
- "Graduate Dean" refers to the Dean of the School of Graduate Studies.
- "Day" means normal university school day when regular classes or examinations are held, not including Saturday and Sunday.
- "Graduate Committee" refers to the committee of Graduate Dean and student designee.

3. Definitions:

- "Graduate Dean" refers to the Dean of the School of Graduate Studies or his or her designee.
- "Day" means normal university school day when regular classes or examinations are held, not including Saturday and Sunday.
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- "Grievance Hearing Panel," hereby known as the Panel, is the group of Graduate Committee faculty and student designee who are chosen to be present at a grievance hearing.
- "Grievant" is the student filing the grievance.

4. A Panel consists of the Chair or Vice Chair of the Graduate Committee acting as non-voting Chair of the Panel, four voting members of the Graduate Committee and one voting graduate student (normally the Graduate Committee student member). Each Student Grievance Hearing will be heard by a separate Panel appointed by the Graduate Committee Chair. When establishing Panels, the Graduate Committee Chair will consider the expertise and experience of the members, their familiarity with student grievance hearings, the breadth of background they bring to the Panel, and the potential for perceived conflicts of interest. In the process of setting Panels, Panel members should indicate if they have any potential conflicts of interest. In the event that the Chair of the Graduate Committee is associated with the grievant’s department, or in some other way has a conflict of interest, delegation of Panel members will fall to the Vice Chair of the Graduate Committee. The grievant and the Graduate Dean may each disqualify, for any reason, up to two of the Graduate Committee members from serving on the Panel.

III. FILING A GRIEVANCE

1. A student who disputes an academic decision should first discuss his or her concerns with the Dean of the School of Graduate Studies.

2. The student must file seven copies of a Request for Grievance Hearing (see section III. D, below) stating the grounds and argumentation in support of a grievance to the Chair of the Graduate Committee, not to exceed 10 double-spaced pages excluding attachments. The Chair of the Graduate Committee will review the request to make certain it grieves an action of the Graduate Dean. Grievances that are not within the jurisdiction of the Graduate Committee will be dismissed and returned to the student.

3. A grievance hearing is not a rehearing of the case. The following shall be allowed as grounds for grievance:

a. Action of the Graduate Dean not being commensurate with the problem being addressed.

b. Decisions contrary to the weight of evidence.

4. Seven written copies of the Request for Grievance Hearing must be submitted to the Chair of the Graduate Committee no later than 20 days after receiving notification of the action that the student is seeking to be overturned or changed. The request should identify:

a. The disputed academic decision (within the jurisdiction of the Graduate Committee);

b. The person that made the decision;

c. The date the decision was made;

d. All efforts made to resolve the dispute informally and formally;

e. Information directly relevant to the Panel’s review of the grievance;

f. Relevant witnesses or individuals whom the grievant may call during the hearing;

g. Any other relevant pertinent evidence or documents; and:

h. The desired outcome the student is seeking as a result of a grievance hearing.

5. The Graduate Committee chair will notify the student in writing of his or her decision regarding the Request for Grievance Hearing within 5 days of receiving the request. If the Graduate Committee chair approves the Request for Grievance Hearing, the student will receive a list of prospective members of the Panel with the letter notifying them of the chair’s decision. The Recording Secretary will also send the Request for Grievance Hearing and supporting information to the Dean of the School of Graduate Studies within 5 days of the approval decision.

6. Within 10 days of receiving notice of the grievance from the Recording Secretary, the Graduate Dean will provide six copies of a written response (and supporting documents) to the Graduate Committee Chair and one copy to the grievant. The response may not exceed 10 double-spaced pages excluding attachments. The request should identify:

a. Issues raised by the grievant;

b. All efforts made to resolve the dispute informally and formally;

c. Information directly relevant to the Panel’s review of the grievance;

d. Relevant witnesses or individuals whom the Graduate Dean may call during the hearing;

e. Any other relevant pertinent evidence or documents; and

f. If the desired outcome the Graduate Dean is seeking as a result of a grievance hearing.

IV. INITIAL REVIEW OF GRIEVANCES

Within 10 days of receiving the Graduate Dean’s response, the Chair of the Graduate Committee will appoint a Panel, as outlined above and communicate the names of the Panel members to the grievant and the Graduate Dean.

The grievant and the Graduate Dean must inform the Chair of the Graduate Committee within 5 days if he/she wishes to disqualify any prospective Panel members. Once the Panel has been established, a date for the hearing will be set. The Chair of the Panel will send notice of the hearing to the student and the Graduate Dean. The notice will include the date, time, location and procedures of the hearing. The Chair of the Panel may invite others to provide information at the hearing. The grievance hearing will be normally scheduled within 10 days of the Graduate Dean’s written response to the filed grievance.

V. MEDIATION

At any time the parties may consider mediation of outstanding issues. None of the parties or the Graduate Committee will conduct the mediation. All applicable timelines remain in effect, unless extended by the Chair of the Graduate Committee.

VI. GRIEVANCE HEARING

1. If either party intends to submit supplemental materials (six copies) to the Panel for consideration, he/she must also provide hard copies to the other parties to the hearing. All copies must be provided at least 5 days prior to the scheduled hearing. These materials may not exceed 10 double-spaced pages excluding attachments. Failure to provide copies in time may result in the materials not being considered by the Panel.

2. Hearings will be conducted in a manner conducive to ascertaining the facts of the case. Parties to the grievance will be provided an opportunity to:

a. Be present and hear all arguments and oral statements made to the Panel during the hearing;

b. Make arguments, present oral statements and written documents, and call witnesses with regard to issues of fact relevant to the grounds for grievance;

c. Ask questions of other witnesses, either directly or through the Chair (to be determined by the Chair).

3. Each party may be accompanied at the hearing by an advisor, who may be a lawyer. The advisors are not allowed to address the Panel, question witnesses, or take an active Graduate Academic Information role in the proceedings. The advisor is simply there to provide advice to a party. The Graduate Dean will not bring a lawyer unless the grievant indicates he/she intends to bring a lawyer. If the grievant intends to bring a lawyer, he/she should notify the Graduate Dean and the Chair of the Graduate Committee 5 days prior to the start of the hearing.

4. At any time, the Chair of the Panel may consult an advisor or a lawyer, call witnesses, or ascertain information deemed relevant to the grievance. The Chair of the Panel is authorized to request the appearance of additional
VIII. ORDER OF PROCEEDINGS IN A GRIEVANCE HEARING

1. The Chair will begin the hearing with a brief opening statement. The Chair will then ask each person in the room to introduce himself or herself for the record. The Chair will state the reason for the hearing, describe the role of the Panel and explain the procedures to be followed. The Chair will ask the student filing the grievance whether he or she wishes the hearing to be open or closed. If the student requests a closed hearing, only the Recording Secretary, the principal parties, the Panel and, if applicable, their advisors shall remain. Witnesses will only be allowed in the room when they are presenting, but may be asked to remain available to answer additional questions later in the proceedings.

2. Following the Chair’s summary, and unless otherwise determined by the Chair of the Panel, the order of presentation will be:
   a. Grievant presents case, including witnesses and other evidence (30 minutes). Members of the Panel may ask brief questions to clarify a point, but in general the student should be allowed to present without interruption. Witnesses must exit after providing their information, and should not be allowed to speak with each other until released. They should be available for questions later;
   b. Graduate Dean presents case, including witnesses and other evidence (30 minutes). Members of the Panel may ask brief questions to clarify a point, but in general the Graduate Dean should be allowed to present without interruption. Witnesses must exit after providing their information, and should not be allowed to speak with each other until released. They should be available for questions later;
   c. Panel members question either party and witnesses. Determination of the order of questions, requesting the presence of witnesses, and managing the dialog during the hearing is done at the discretion of the Chair in consultation with other members of the Panel;
   d. Summary by the Graduate Dean (5 minutes);
   e. Summary by the Student (5 minutes);
   f. Declaration by the Chair that the hearing is concluded.

VIII. FINDINGS, DECISIONS, AND RECOMMENDATIONS OF THE PANEL

1. Upon completion of the hearing, the Panel will meet in closed session for deliberations. If the student requests an open hearing, then deliberations will also be open. If the process requires more time than originally scheduled, the Panel may suspend its discussion and reconvene at an agreed upon later date and time. A simple majority vote of the Panel is required for all findings, decisions, and recommendations.

2. If, in the course of deliberations, the Panel determines it would like to obtain additional information from either party, or from any other individual that the Panel feels could provide useful information, the Chair of the Panel will reopen the hearing at a mutually convenient time for all parties.

3. The Panel Chair will prepare a written final decision, to include:
   a. A statement addressing the subject of the grievance;
   b. A decision that indicates whether the grievance is upheld, denied, or if a modified solution to the situation is recommended;
   c. (Optional) recommendations, if appropriate, for further actions by University authorities.

4. All members of the Panel sign the Decisions, Findings, and Recommendations document.

5. The Panel will provide the grievant and the Graduate Dean with a copy of the decision of the Panel within 10 days from the date of the conclusion of the hearing.

IX. SUBSEQUENT HEARINGS

1. The Panel acts on behalf of the Graduate Committee. The student may grieve the decision of the Panel to the Student Academic Standards Committee.
Departmental Courses, Programs

The following graduate degree and certificate programs are offered through the UND School of Graduate Studies.

The University publishes electronically an official Schedule of Courses before the beginning of each academic term. It lists the class period, building, and room assigned to each course offered that semester or summer session.

Accountancy (p. 324) | MAcc (p. 326)

Aerospace Sciences (p. 327) | PhD (http://und-public.courseleaf.com/graduateacademicinformation/departmentalcoursesprograms/spacestudies/ss-as-phd)

Art and Design Visual Arts (p. 329) | MFA (p. 329)

Arts and Sciences (p. 330)

Atmospheric Sciences (p. 330) | PhD (p. 332) | MS (p. 332)

Aviation (p. 333) | MS (p. 337)

Biological Sciences (p. 339) | PhD (p. 342) | MS (p. 342)

Biomedical Engineering (p. 433) | PhD (p. 433) | MS (p. 434)

Biomedical Sciences (p. 343) | PhD (p. 346) | Joint MD/PhD (p. 346) | MS (p. 347)


Chemical Engineering (p. 435) | PhD (p. 436) | MS (p. 437) | MENG (p. 436)

Chemistry (p. 356) | PhD (p. 358) | MS (p. 358) | Combined BS/MS (p. 357)

Civil Engineering (p. 437) | PhD (p. 438) | MS (p. 440) | MENG (p. 440) | Combined (p. 438)

Clinical Translational Science (p. 359) | PhD (p. 360) | MS (p. 361)

Communication (p. 361) | PhD (p. 362) | MA (p. 363)

Communication Sciences and Disorders (p. 364) | MS (p. 365)

Computer Science (p. 365) | PhD (p. 367) | MS (p. 369)

Counseling Psychology and Community Services (p. 370) | PhD (p. 373) | MA (p. 375) | Combined BS/MA (p. 373)

Counseling with a K-12 Emphasis | Cert (http://und-public.courseleaf.com/graduateacademicinformation/departmentalcoursesprograms/counselingpsychologyandcommunityservices/coun-cert)

Criminal Justice (p. 377) | PhD (p. 378)

Curriculum and Instruction (p. 397) | MS (p. 400)

Cyber Security | MS (p. 447)

Data Science | MS (p. 370) | Joint MS/MBA (http://und-public.courseleaf.com/graduateacademicinformation/departmentalcoursesprograms/computerscience/csci-ms-ms-ds-joint)

Early Childhood Education (p. 401) | MS (p. 404) | Accelerated BSED/MS (http://und-public.courseleaf.com/graduateacademicinformation/departmentalcoursesprograms/education/teachinglearning/accel)

Earth System Science and Policy (p. 378) | PhD (p. 380) | MS (p. 381) | MEM (p. 380)


Educational Foundations and Research (p. 384) | PhD (p. 386)

Learning Analytics | Cert (p. 386)

Quantitative Research Methods | Cert (p. 386)

Educational Practice and Leadership | EdD (p. 395)

Educational Studies | MS (p. 387)

Educational Leadership (p. 388) | PhD (p. 390) | EdD (p. 389) | MS (p. 392) | MEd (p. 391) | Specialist Diploma (p. 392)

Electrical Engineering (p. 441) | PhD (p. 446) | MS (p. 449) | MENG (p. 447) | Combined (p. 446)

Elementary Education (p. 405) | MS (p. 408) | MEd (p. 408)

Energy Systems Engineering (p. 449) | PhD (p. 449) | MS (p. 450) | MENG (p. 450)

Engineering (p. 432) | PhD (http://und-public.courseleaf.com/graduateacademicinformation/departmentalcoursesprograms/engineering/phd)

English Language Learners (TESOL) (p. 409) | MEd (p. 412)


Environmental Engineering (p. 450) | PhD (p. 451) | MS (p. 451) | MENG (p. 451) | Cert (p. 450)

Forensic Psychology | MS (p. 531) | MA (p. 530)

Geography and Geographic Information Science (p. 458) | MS (p. 460) | MA (p. 460) | Cert (p. 458)


Geology (p. 461) | PhD (p. 462) | MS (p. 463) | MA (p. 463)

Higher Education (p. 412) | PhD (p. 414) | EdD (p. 414) | MS (p. 415)

History (p. 464) | PhD (p. 466) | DA (p. 465) | MA (p. 467)


eLearning | Cert (http://und-public.courseleaf.com/graduateacademicinformation/departmentalcoursesprograms/education/idt-cert-el)

K-12 Technology Integration | Cert (http://und-public.courseleaf.com/graduateacademicinformation/departmentalcoursesprograms/education/idt-cert-te)
Accountancy

Master of Accountancy (p. 326)

Courses

ACCT 501. Seminar in Accounting Issues. 3 Credits.
Addresses current issues in accounting and develops appropriate professional judgment through researching and applying accounting standards. Prerequisite: Permission of MAcc director. F.S.

ACCT 502. Financial Reporting and Decision Making. 3 Credits.
This course provides an overview of financial accounting terminology and concepts, financial statements, and the financial reporting process. Emphasis is placed on the decision usefulness of financial statement information and the financial reporting process as a means of communicating information about firms. Prerequisite: Successful completion of Ivy Software’s “Business Math and Statistics Graduate” self-paced course or demonstrated equivalent competencies. F.S.

ACCT 503. Advanced Financial Accounting. 3 Credits.
Accounting for inter-corporate investments, business combinations, and other advanced financial accounting topics. Prerequisite: Permission of MAcc Director. F.S.
ACCT 504. Seminar in Auditing. 3 Credits.
Expands understanding of the auditing function and provides a framework for analyzing contemporary auditing and assurance issues. Prerequisite: Permission of MAcc Director. F.

ACCT 506. Accounting Systems. 3 Credits.
This course examines business processes and controls within the context of enterprise resource planning systems (ERP), with an emphasis on the financial cycle. Prerequisite: Permission of MAcc Director. S.

ACCT 507. Advanced Managerial Accounting. 3 Credits.
Functional uses of accounting in management of the enterprise.

ACCT 508. Fraud Examination. 3 Credits.
Focuses on understanding types of fraud as well as collecting and evaluating evidence relating to preventing and detecting frauds. Evidence gathering methods will include the examination of documents, publicly available information, and standard practices for interviews and interrogations. Prerequisite: ACCT 405 or equivalent.

ACCT 509. Accounting Information for Decision and Control. 3 Credits.
Management accounting concepts and their application in internal planning, control, and decision-making. Prerequisite: ACCT 502. F,S.

ACCT 510. Taxation of Individuals. 3 Credits.
This graduate-level course covers federal taxation of individuals. Prerequisite: Permission of MAcc Director. F.

ACCT 511. Taxation of Businesses. 3 Credits.
This graduate-level course covers federal taxation of business organizations. Prerequisite: Permission of MAcc Director. S.

ACCT 512. Accounting for Governments & Nonprofits. 3 Credits.
This course covers accounting for governmental and nonprofit entities, including fund accounting. Prerequisite: Permission of MAcc Director. S.

ACCT 521. Financial Accounting I. 3 Credits.
This is a first course in financial accounting for graduate students that has a preparer orientation, but also provides a foundation for analyzing financial statements. Specific content focuses on assets and current liabilities as well as the formats and uses of the primary financial statements. Prerequisite: Permission of MAcc Director. F,S,SS.

ACCT 522. Financial Accounting II. 3 Credits.
This is the second course in the financial accounting sequence for graduate students. The course has a preparer orientation, but also provides a foundation for analyzing financial statements. Prerequisite: ACCT 521 or Permission of MAcc Director. F,S,SS.

ACCT 523. Financial Accounting III. 3 Credits.
This course is part of the graduate financial accounting sequence. The course has a problem-solving orientation, and involves the application of accounting principles to complex transactions and topics including deferred taxes, leases, and pensions. Prerequisite: ACCT 522 or permission of the Director of the Master of Accountancy program. F,S,SS.

ACCT 525. Audit & Assurance Services. 3 Credits.
Examines the role that assurance services play in improving the quality of financial information, and its usefulness for decision making. Materiality and risk assessment are considered along with processes and controls in relation to financial statement audits. Prerequisites: ACCT 522 and ACCT 506, or Permission of MAcc Director. S.

ACCT 526. Advanced Business Law for Accountants. 3 Credits.
Examines legal topics relevant to accountants and financial professionals including securities law, commercial paper, secured transactions, professional liability, corporations and partnerships. Prerequisite: Permission of MAcc Director. S.

ACCT 527. IT Governance and Audit. 3 Credits.
This course introduces topics related to information technology governance and audit, and their roles in internal control and risk management in accounting. Prerequisite: Admission into the Master of Accountancy program or permission of the Director of the Master of Accountancy program. On demand.

ACCT 560. Personal Accountability & Ethics. 3 Credits.
Examines foundations of ethical behavior with an emphasis on personal accountability. Issues, regulations, and cases relevant to accountants and auditors are examined. Approaches for dialogue in the context of ethical issues are introduced. Includes a service project component. Prerequisite: Permission of MAcc Director. F.

ACCT 561. Accounting Ethics and Leadership. 3 Credits.
Accounting professionals have a special role in assuring the quality of financial reports, and in conveying useful information to stakeholders throughout society. Identifying, and being able to effectively respond to, ethical issues are important skills for accounting professionals. This course explores the concepts of ethical thinking, professional behavior, integrity, and independence, as well as specific principles as identified in the Codes of Professional Conduct. The ethical tone of an organization is set by its leaders, and thus an understanding of leadership, and how managers can effectively lead others in a responsible manner, is important to understand from both the perspective of being a leader, and working with leaders in an organization. Prerequisite: Admission into the Master of Accountancy program or permission of the Director of the Master of Accountancy program. F,S,SS.

ACCT 575. Special Topics. 3 Credits.
Specific topic will vary from offering to offering at the discretion of the department. Prerequisites and/or corequisites may be required depending upon the special topic selected. Course may be repeated up to a total of nine credits with permission of department. Prerequisite: Permission of department. Repeatable to 9 credits.

ACCT 590. Contemporary Readings in Accounting. 2 Credits.
Review of outstanding monographs and other writings in the field of accounting.

ACCT 591. Accounting Research. 1-6 Credits.
Individual student projects designed to develop skills in accounting research.

ACCT 592. Research in Federal Tax. 1-4 Credits.
Research in Federal Income Tax with emphasis on corporations and shareholders. Prerequisite: ACCT 411 or equivalent. Repeatable to 4 credits.

ACCT 593. Research in Business Law. 1-4 Credits.
Individual projects designed to develop basic skills in legal research.

ACCT 597. Graduate Accounting Internship. 1-6 Credits.
Compensated work experience in various areas of accounting. Must follow processes and meet internship requirements of the Department of Accountancy and CoBPA. Prerequisite: Permission of MAcc Director. Repeatable to 6 credits. S/U grading. F,S,SS.

ACCT 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

ACCT 997. Independent Study. 2 Credits.
The independent study requires the student to investigate a topic in accounting and to prepare a formal report satisfactory to the MAcc Program Director.

ACCT 998. Thesis. 1-15 Credits.

Undergraduate Courses for Graduate Credit

ACCT 309. Accounting Information Systems. 3 Credits.
The application of systems design and use from the accountant's perspective. Coverage includes computerized and manual accounting systems, elements of internal control, flowcharting, and the interface of accounting and management information systems. Prerequisites: ACCT 301 and Junior or Senior Standing; declared CoBPA majors only. F,S.

ACCT 312. Fund Accounting. 3 Credits.
Financial accounting, control, and reporting for governmental and not-for profit entities. Prerequisites: ACCT 201 and ACCT 218; Junior or Senior Standing; declared CoBPA majors only. F,S.

ACCT 320. Cost Accounting. 3 Credits.
Principles and techniques used to account for and analyze costs incurred to produce products or services. Prerequisite: ACCT 201. Prerequisite or Corequisite: ACCT 218. F,S.

ACCT 401. Advanced Accounting. 3 Credits.
Special problems in accounting including consolidated statements, partnerships, and foreign exchange. Prerequisites: ACCT 302; Junior or Senior Standing; declared CoBPA majors only. F,S.

ACCT 403. Contemporary Accounting Theory. 3 Credits.
A study of the emerging issues and the problems facing the accounting profession with special emphasis on the authoritative pronouncements as designated by the American Institute of CPAs and the Financial Accounting Standards Board. S-U grading not allowed. Prerequisite or Corequisite: ACCT 401 or consent of instructor; declared CoBPA majors only. F,S.
ACCT 405. Assurance Services. 3 Credits.
Explores methods of improving the quality of information or its context for decision makers. Examples include assurances on the reliability of financial statements, the processes and controls used to manage and operate businesses, assertions and agreements made to third parties, and regulatory compliance. Prerequisites: ACCT 302, ACCT 309, ECON 210; Junior or Senior Standing; declared CoBPA majors only. F.S.

ACCT 406. Independent Assurance. 3 Credits.
Auditing and assurance theory as applied by independent accountants. Prerequisites: ACCT 405 or consent of instructor; declared CoBPA majors only. S.

ACCT 410. Federal Individual Income Tax. 3 Credits.
Federal income tax relating to individuals to include the more complex tax situations. A computerized individual income tax preparation is used as a part of the course. Prerequisites: ACCT 201; Junior or Senior Standing; declared CoBPA majors only. F.S.

ACCT 411. Business Income Taxation. 3 Credits.
Federal income tax relating to corporations and partnerships. Introduction to estate and gift tax and fiduciary income tax. Prerequisites: ACCT 302; Senior Standing; declared CoBPA majors only. F.S.

ACCT 416. Business Law for Accountants. 3 Credits.
Both foundational and advanced topics in business law relevant for the practice of public accountancy including agency law, contracts, negotiable instruments, ethics, legal representation in business, and the impact of selected governmental regulations on businesses. Prerequisites: Declared CoBPA majors or students admitted to the Master of Accountancy program, only. F,S,SS.

Master of Accountancy

Admission Requirements

Admission to Approved status requires:

1. A four-year bachelor’s degree from a recognized college or university.

2. Completion of the Graduate Management Admission Test (GMAT) with a score that equals or exceeds an overall score of 500. In certain circumstances, applicants may substitute the GRE for the GMAT. The requirement for test scores will be waived for applicants holding a bachelor’s degree with a major in accountancy (or equivalent) from an AACSB accredited college and for applicants for combined admission. At the discretion of the MAcc Program Director, test scores may be waived for applicants holding either a graduate degree or a bachelor degree and a demonstrated high quantitative ability.

3. An overall grade point average of at least 2.75 in the undergraduate degree program (based on 4.00 scale), or a 3.00 GPA, or equivalent, for the last two years.

4. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

5. For either the Professional Accountancy Track or the Practitioner Track only, a bachelor’s degree in accounting, or coursework including intermediate accounting, audit, cost/managerial accounting and taxation that is deemed equivalent by the MAcc Program Director.

Applicants for combined admission and the Accelerated Bachelor’s/Masters’ (ABM) 5 year degree program will be eligible only for the Professional Accountancy Track. Applicants with a bachelor’s degree with a major in accountancy or equivalent accountancy coursework will be eligible only for either the Professional Accountancy Track or the Practitioner Track. Applicants who fail to meet the minimum grade point or GMAT requirements, but who otherwise show high potential for success may be considered for admission to Provisional Status with the approval of the MAcc Program Director and the Department Chair.

Combined Admission

The intent of the combined BAcc/MAcc program is to allow qualified students to complete the requirements for both degrees in one year beyond that required to receive the baccalaureate degree. All requirements for both degrees must be met, and up to six credits of prior-approved graduate accounting coursework, preferably at the 500-level, may be double-counted toward each of the two degrees.

UND students currently completing their junior year (90 credits) towards an accounting undergraduate degree may apply to the MAcc under combined admission. Combined admission to the MAcc program may be granted to accounting students with a minimum of 90 credits completed and both an overall grade point average of 2.75 (based on a 4.00 scale) and 3.00 GPA average for all courses with an accounting prefix completed at the date of application and admission. The GMAT requirement will be waived for those applying for combined admission.

ABM 5 Year Degree Program Admission

The ABM degree program allows exceptional undergraduate students at UND an opportunity to complete the requirements for both the bachelor’s and master’s degrees at an accelerated pace. All requirements for both degrees must be met, and these students may double count up to 12 graduate-level credits towards the requirements for both their Bachelor in Accountancy and their Master of Accountancy degree requirements. ABM students must obtain their Master of Accountancy degree within 12 months of completing the Bachelor of Accountancy degree, provided that the degree requirements can be completed in that timeframe.

High achieving high school students (GPA of at least 3.5/4.0 and an ACT score of 25 or higher) will initially be considered for “identified” status and become eligible for formal admission when they meet the same criteria that undergraduates must meet for admission into the ABM program. Admission is a competitive process. The following are minimum eligibility requirements:

1. Students must meet the School of Graduate Studies admissions eligibility requirements.

2. Students must have completed a minimum of 60 credits, including credits earned from advanced placement and dual credit. Students must apply before completion of the undergraduate degree.

3. Transfer students with a minimum of 60 credits—whether from the transfer institution alone or in combination with UND credits—must have a minimum cumulative GPA of 3.0/4.0 at the time of admission to the ABM program.

4. Students must have a minimum cumulative GPA of 3.0/4.0 at UND at the time of admission into the ABM program.

5. ABM program applicants must submit the standard application to the School of Graduate Studies, the application fee, a personal statement, and transcripts. ABM program applicants do not need to take the GMAT.

6. Additionally, ABM program applicants must submit a detailed Program of Study that describes the 12 credits of double counted courses, the courses that will be taken after being accepted into the MAcc program, the courses that will be taken before graduation from the Bachelor of Accountancy program, and the expected graduation date for each degree. The submitted program of study must be signed by the student, the student’s undergraduate advisor, the student’s graduate advisor, and the Master of Accountancy Program Director.

Degree Requirements

The MAcc degree program offers graduate courses in most of the functional areas of the accounting discipline. The MAcc program has three tracks: the Professional Accountancy Track, the Practitioner Track and the Accounting Fundamentals Track. Program requirements are:

1. A minimum of 30 semester credits of academic work must be completed. The grade point average for all courses listed on the Program of Study must be 3.00 or higher. ABM students must also maintain at least a 3.0 GPA in their double counted courses and as a cumulative GPA for their Bachelor of Accountancy degree. The Program requires completion of the MAcc Core, which includes 6 semester credits of required coursework of ACCT 501 “Seminar in Accounting Issues” and ACCT 503 “Advanced Corporate Financial Accounting”.

2. Completion of either (a.) the Professional Accountancy Track or (b.) the Accounting Fundamentals Track or (c.) the Practitioner Track
   a. The Professional Accountancy Track is designed for students holding undergraduate accounting degrees. This track requires 25-26 credits of coursework in addition to completion of the MAcc Core.
The Accounting Fundamentals Track is designed for students who have not previously completed significant amounts of accounting coursework. It provides a graduate level option for individuals holding a bachelor's degree in a discipline outside of accounting to prepare and meet requirements to sit for the CPA exam in some jurisdictions. In addition to completing the MAcc Core, students in this track are required to complete the following 24 credits of required graduate level accounting coursework:

- ACCT 521 Financial Accounting I 3
- ACCT 522 Financial Accounting II 3
- ACCT 523 Financial Accounting III 3
- ACCT 506 Accounting Systems 3
- ACCT 509 Accounting Information for Decision and Control 3
- ACCT 511 Taxation of Businesses 3
- ACCT 525 Audit & Assurance Services 3
- ACCT 416 Business Law for Accountants 3

Students should be aware that each jurisdiction has different requirements to take the CPA exam. Some jurisdictions require that students earn a minimum number of nonaccounting business credits before applying. Before applying to take the CPA exam students should check the educational requirements in that jurisdiction.

c. The Practitioner Track is designed for students holding undergraduate degrees in accounting. This track requires 24 credits of coursework beyond the MAcc core. These 24 credits include:

- ACCT 504 Seminar in Auditing 3
- ACCT 512 Accounting for Governments & Nonprofits 3
- ACCT 561 Accounting Ethics and Leadership 3
- ACCT 509 Accounting Information for Decision and Control 3
- ACCT 511 Taxation of Businesses 3
- ACCT 527 IT Governance and Audit 3
- ACCT 416 Business Law for Accountants 3
- ISBC 510 Business Intelligence 3

Students who have already completed courses similar to those in the MAcc curriculum may be required to choose substitutes from graduate credit offerings listed in the catalog. Substitutions require prior approval of the MAcc Program Director.

Aerospace Sciences

Ph.D. in Aerospace Sciences (http://und-public.courseleaf.com/graduateacademicinformation/departmentalcoursesprograms/spacescience/iss-as-phd)

Courses

AVIT 501. General Issues in Aviation/Aerospace. 3 Credits.
This course is designed to introduce students to graduate school, library resources, and faculty research interests. Students will explore the historical, current and future issues related to their own interest areas in the aerospace industry. F.S.

AVIT 502. Aviation Economics. 3 Credits.
An in-depth examination of the economic aspects of the air transportation industry, with microeconomic analysis applied to decision making in the airline, general and corporate aviation, and airports. Topics include: basic economics of air transport supply and demand; demand forecasting; cost drivers; yield, revenue and capacity management; regulatory issues; political influences; and unique economic characters of international commercial aviation.

AVIT 503. Statistics. 3 Credits.
This course is an in-depth study of inferential statistics with emphasis on the analysis of variance models and subsequent comparison procedures. In addition, the course will include coverage of correlation and multiple regression techniques as data analytic tools. Also, coverage of survey construction and analysis of survey data will be presented. Course content will be presented within the context of aviation and psychology examples. (Psychology 541: Advanced Univariate Statistics can be substituted for AVIT 503). Prerequisite: An introductory statistics course or calculus course.
AVIT 504. Research Methods. 3 Credits.
Methods and procedures of development, design and analysis related to aviation industry research. Topics include problem identification, review of literature, research design, and data analysis. This course is designed to give an overview of quantitative, qualitative and mixed-method approaches research design. The course includes the experience of critically evaluating research projects and developing a research project based on the principles discussed in class. Prerequisites: AVIT 501, and AVIT 503 or PSYC 541. F.

AVIT 505. Qualitative Research Methods. 3 Credits.
Examination and analysis of qualitative research design with particular emphasis on approaches relevant to problems in Aerospace Studies or related fields. Students will design a qualitative research project.

AVIT 506. Quantitative Research Methods. 3 Credits.
The purpose of this course is to provide students the opportunity to acquire knowledge and skills necessary to apply quantitative research methods in research. Students will design a quantitative research project. Prerequisite: A graduate level Statistics course.

AVIT 507. Advanced Research Methods. 3 Credits.
This course will be a thorough discussion of the different methodologies utilized in theoretical and applied research. Experimental and quasi-experimental design, and topical areas of survey methodology data mining, simulations, and techniques for dissertation designs. Prerequisites: AVIT 503, AVIT 505, and AVIT 506.

AVIT 510. Aviation Policy Public Policy and Regulations. 3 Credits.
This course will examine and discuss the initiation, formulation and implementation of public policies that affect the various segments of the aviation industry. Various regulatory areas within the aviation industry, such as scheduled air carriers, general aviation, airport operations, air traffic management, and international agreements, will be analyzed. On demand.

AVIT 511. Aviation Information Technology. 3 Credits.
This course is an introduction to information systems essential to an aviation business professional. It will provide an overview of current and emerging technologies in various database, data communication and e-commerce systems.

AVIT 512. Aviation Environmental Issues. 3 Credits.
This course examines current environmental issues within the aviation industry in the context of historical environmentalism, current laws and regulations, and emerging research findings. A broad survey of earth systems precedes a focused examination of contemporary aviation environmental issues.

AVIT 513. Aviation Safety Management Systems. 3 Credits.
An in-depth study of aviation safety management concepts and principles as they relate to effective safety programs within the airlines, corporate aviation, general aviation and airports.

AVIT 514. Aviation Management Theory. 3 Credits.
An in-depth review of organizations in the aviation industry, their structures, environments and leadership as it relates to human behavior. Topics include organizational design, climate and the interactions with individuals, groups, and different organizational structures within the airline, general aviation, corporate aviation and airport organizations.

AVIT 515. Human Factors and Ergonomics: Human Perceptions in Information Systems Design. 3 Credits.
Human perception and information processing will be discussed in relation to information system design requirements to optimize human performance. The Ergonomics components will highlight human-centered design of equipment, devices and processes that conforms to the human body (anthropometry) and its cognitive abilities within the aviation/aerospace environment. Topics include information systems design with regard to compatibility, perception, attention, situation awareness and decision processes. Applications to current workstation design will allow students to have a greater understanding of human centered design goals. On demand.

AVIT 516. Training System Design. 3 Credits.
The process of memory, learning, and judgment will be related to instructional design strategies in the aviation industry, where heavy use of simulation is used in the training and evaluation of aviation professionals. Topics include instructional design and assessment concepts, simulation design and decision making skills. Class presentations include operational problem-solving group work as well as research paper reviews.

AVIT 517. Airline Labor Relations and Law. 3 Credits.
This course will examine and discuss the application and impact of the Railway Labor Act as it pertains to air carrier labor operations. Topics of study will include labor history, organization, alternative dispute resolution, collective bargaining, and emerging labor trends. On demand.

AVIT 518. Human Error. 3 Credits.
The objective of this course is to develop a deeper understanding of the human error and its impact upon human performance in variety of fields. Prerequisite: Graduate Admission. S.

AVIT 520. Strategic Airport Planning. 3 Credits.
This course will explore the elements of airport planning within the public administration domain. Emphasis will be placed on individual airport’s strategic plans, how airports operate efficiently and effectively with changing regulations and economic fluctuations in the global marketplace.

AVIT 521. Ethics in Aerospace. 3 Credits.
The course will introduce ethical concepts and frameworks used in professional decision-making. Students will engage with faculty and outside speakers to weigh decisions in the applicable ethical frameworks. Students participation will include graded elements of formal case presentations, class discussion sessions, essay examinations and review of scholarly and trade journal articles. The course will have a strong emphasis on research project design to assess dynamics of ethical decision-making in different populations, as well as exploring educational opportunities in the aerospace industry.

AVIT 522. UAS Management. 3 Credits.
This course provides a series of lectures or presentations by visiting lecturers or faculty on various themes related to Unmanned Aircraft Systems (UAS). Prerequisite: Graduate Student Status. F, odd years.

AVIT 523. Aviation Safety Data Analysis. 3 Credits.
The objective of this course is to obtain an understanding of various safety programs conducted throughout the aviation industry and examine the underlying analytical techniques associated with each program. Prerequisite: Graduate student status. SS.

AVIT 524. Air Traffic Management. 3 Credits.
This course will explore the elements of Air Traffic and Next Gen. There will be a discussion on how air traffic control works and the evolution of the Air Traffic Management of the National Airspace System in the US and abroad. Emphasis will be on the current day issues and how Air Traffic Management is changing not only in the US but in Canada, Europe and worldwide. Prerequisite: Admission (or conditional admission) to the Aviation Master of Science, The Aerospace PhD program, or consent of the instructor. S, odd years.

AVIT 525. Legal Issues in Aviation. 3 Credits.
The course will introduce legal concepts and frameworks of the United States’ legal system. Issues particular to the aviation industry will be discussed. Students will engage in formal case presentations and discussions to gain an understanding of the legal issues faced in the aerospace industry. Prerequisite: Admission (or conditional admission) to the Aviation Master of Science program, the Aerospace PhD program, or consent of the instructor. SS, even years.

AVIT 526. UAS and the Law. 3 Credits.
This course introduces students to the laws and policies governing UAS operations including flight regulations, remote sensing issues, and data and cybersecurity issues related to UAS. The class scope of inquiry includes US and international law and examines both civil and military use. On demand.

AVIT 587. Supervised Field Work. 1-3 Credits.
Used primarily for individualized field placement so that the student may acquire practical experiences in the aviation industry. Prerequisite: Consent of graduate director. Repeatable to 6 credits. S/U grading.

AVIT 590. Aviation Seminar. 1-3 Credits.
A series of lectures presented by visiting lecturers and the faculty. Repeatable to 9 credits.

AVIT 591. Readings in Aviation. 1-3 Credits.
Readings in selected Aerospace Studies topics, with written and/or oral reports. Prerequisite: Consent of instructor. Repeatable to 6 credits.

AVIT 593. Individual Research in Aviation. 1-3 Credits.
Individual student projects designed to develop advanced knowledge in a specific area of expertise. A written report is required. May be repeated for up to 6 credits for Master’s and up to 12 credits for Ph.D. Repeatable to 6 credits.
AVIT 595. Aviation Capstone. 3 Credits.
The Capstone course integrates, extends and applies knowledge learned in earlier Aviation courses and research projects. The course also undertakes an in-depth study of management theories relevant to the aviation industry and how leaders apply these theories in practice. Students will have the opportunity to demonstrate their knowledge and leadership abilities by working in teams to design and develop a solution to a current aviation problem, which will be assigned by the instructor. This effort will culminate in an on-campus presentation to the faculty and invited industry experts. Prerequisite: AVIT 504 or permission of instructor.

AVIT 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

AVIT 997. Independent Study. 2 Credits.
Independent study and preparation of a written report. Prerequisite: Special Permission Only. On demand.

AVIT 998. Thesis. 4 Credits.
Preparation and defense of a thesis based on original research. Prerequisite: Admission committee approval and consent of instructor. Repeatable to 4 credits.

AVIT 999. Dissertation. 1-12 Credits.
An original research project approved by and completed under the supervision of a dissertation committee. Prerequisites: Graduate standing, approval, completion, and defense of dissertation proposal. Repeatable to 18 credits.

Art and Design Visual Arts

Master of Fine Arts (p. 329)

Courses

ART 501. Sculpture. 1-6 Credits.
Extensive work and study in three dimensional form, media, and methods. Repeatable to 30 credits. Prerequisite: Permission of instructor. Repeatable to 30 credits.

ART 510. Art History: Issues in Contemporary Art. 3 Credits.
Examines issues in contemporary art relevant to practicing artists. Addresses current intellectual debates around the work of contemporary artists and issues relevant to artists working in a regional setting. Examines the institutional context of contemporary art practice, such as exhibitions venues and funding for professional artists.

ART 520. Painting. 1-6 Credits.
Individual research and experimentation in painting. Repeatable to 30 credits. Prerequisite: Permission of instructor. Repeatable to 30 credits.

ART 530. Drawing. 1-6 Credits.
Experimentation and elaboration to drawing skills and techniques, both innovative and traditional. Emphasis on individual exploration. Repeatable to 30 credits. Prerequisite: Permission of instructor. Repeatable to 30 credits.

ART 537. Graduate Cooperative Education. 1-4 Credits.
An elective opportunity in the VA graduate program toward the MFA to participate in an apprentice experience in one's selected field of concentration. Prerequisites: Graduate standing and approval of departmental advisor/ coordinator.

ART 540. Printmaking. 1-6 Credits.
Individual research and experimentation in printmaking. Repeatable to 30 credits. Prerequisite: Permission of instructor. Repeatable to 30 credits.

ART 550. Ceramics. 1-6 Credits.
Individual instruction and experimentation in Ceramics. Repeatable to 30 credits. Prerequisite: Permission of instructor. Repeatable to 30 credits.

ART 560. Metalsmithing: Jewelry and Small Sculpture. 1-6 Credits.
Exploration of historical, traditional, and innovative jewelry and small sculpture techniques using non-ferrous metals, gems, and other materials. Repeatable to 30 credits. Prerequisite: Permission of instructor. Repeatable to 30 credits.

ART 570. Photography. 1-6 Credits.
Individual instruction and experimentation in Photography. Prerequisite: Permission of instructor. Repeatable to 30 credits. F.S.

ART 573. Graphic Design. 1-6 Credits.
Individual research and experimentation in graphic design and/or interdisciplinary art. Prerequisite: Permission of instructor. Repeatable to 30 credits. F.S.

ART 590. Individual Research. 1-9 Credits.
Research and creative experiences within a specific area of interest in the Visual Arts and emphasis on refinements of aesthetic applications of techniques and media. Repeatable to twenty-two credits. Prerequisite: Permission of instructor. Repeatable to 22 credits.

ART 599. Professional Exhibition. 3 Credits.
Art artist statement, preparation, design, installation, and catalog of solo show. Prerequisite: Permission of student's graduate committee.

AVIT 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

Undergraduate Courses for Graduate Credit

ART 410. Advanced History of Art. 3-6 Credits.
Study of varied topics in the history of art and architecture. May be repeated as title changes. Possible subjects may include but are not limited to: Non-Western Traditions, 20th 21st Century Art, Late 18th through 19th Century Art, Renaissance Baroque Art and Feminist Art. Prerequisites: ART 210 and ART 211. Repeatable. F.S.

ART 417. History of Art: Museum Studies Practicum. 3-6 Credits.
Experience working in an art exhibition setting involving practical experience, research, a written paper and presentation. Prerequisites: ART 210 and ART 211. Repeatable to 36 credits. F.S.

ART 490. Special Projects/ Independent Research. 1-6 Credits.
Advanced independent study within a specific art discipline outside of subject areas normally covered within regularly scheduled courses in studio art, graphic design, art history and art education. Formal contract must be signed with professor of record. Repeatable, no more than 6 credits in each discipline area. Prerequisite: Instructor consent. Repeatable to 6 credits. F.S.

Master of Fine Arts

Admission Requirements

Applicants who are seeking admission to the School of Graduate Studies must meet all of the minimum general School of Graduate Studies admission requirements identified in the graduate catalog. In addition, the prospective students must fulfill the requirements for admission to the graduate program in Visual Arts.

1. Admission to Approved Status requires a BA or BFA degree with at least 63 semester hours in studio courses plus a minimum of 12 semester hours in art history from a regionally accredited college or equivalent.

2. A cumulative Grade Point Average (GPA) of at least 2.75 for all undergraduate work or a GPA of at least 3.0 for the junior and senior years of undergraduate work (based on A= 4.00).

3. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

4. Image portfolio of twenty (20) clearly identified images representative of the student’s recent work and/or documentation on a USB drive. Images should be submitted at 72 dpi with the longest side not to exceed 1280 pixels in length. The work samples should be submitted to the Department of Art and Design’s Graduate Committee and accompanied by a list containing the viewing sequence, titles, date of completion, dimension (duration), and media.

5. Artist Statement supporting the image portfolio or other documentative application information on a USB drive.

6. For students who have earned graduate credit in art or hold an MA degree, a maximum of 15 credits may be accepted towards the MFA degree. Of those 15 credits, up to 6 credits in Art History may be accepted towards the 9-credit art history requirement.

The graduate program in visual arts operates on a rolling admissions basis. Applicants are advised to apply by March 1 for fall admission or October 1 for spring admission. Acceptance as well as financial support is considered pending availability of resources.

Degree Requirements

Students seeking the Master of Fine Arts degree at the University of North Dakota must satisfy all general degree requirements set forth by the School
of Graduate Studies as well as particular requirements set forth by the Department of Art and Design.

1. The program consists of 60 credits in the following areas:

2. Major Emphasis Area (Ceramics, Painting, Drawing, Metalsmithing, Printmaking, Photography, Graphic Design, or Sculpture) 30

   - Art History and Theory (See #6 under Admission Requirements) 9
   - Electives (including at least 12 credits in art) 18
   - Professional Exhibition 3

   Total Credits 60

3. At least one-half of the credits must be at or above the 500-level.
4. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.
5. A critique of each MFA candidate’s work will be conducted by the entire faculty at the end of their first and second semesters in the program. MFA candidates in subsequent years of the program are expected to attend and participate.
6. After the formation of the candidate’s graduate thesis committee two formal reviews of the MFA candidate’s work will be conducted. See candidacy for degree requirements.
7. Prerequisites to graduation include:
   a. Preparation and presentation of a Professional Exhibition, which will be a formal presentation of creative work.
   b. Supplementary exhibitions materials including artist’s statement, exhibition announcement, and publicity materials.
   c. An image portfolio and/or documentation in cd/dvd format of the Professional Exhibition must be submitted to the Department of Art and Design for its permanent files. Images should be submitted at 72 dpi with the longest side not to exceed 1280 pixels in length.

**Professional Exhibition and Artist Lecture**

All MFA candidates are required to register for ART 599 Professional Exhibition (three credits). The intention is to give candidates a summary experience as they near the end of their formal training, which will serve as a benchmark in their career development. The artist’s statement may include such things as a critical statement on the candidate’s work, its development, its cultural, philosophical and historical context, and/or reference to the artist’s procedures and techniques. The candidate will present an Artist Lecture that will be open to the public. The candidate’s graduate thesis committee will then examine and evaluate the student’s performance in the Professional Exhibition and Artist Lecture, and report the results to the School of Graduate Studies on the form titled “Final Report on Candidate” by the deadline specified in the academic calendar. The Thesis Committee Chairperson will certify receipt of an image portfolio of the Exhibition.

**M.F.A. Candidate Recommended Timetable for Completion of Program**

While the program is normally completed in three years, it is possible to achieve the degree in two years.

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<tr>
<th>Year</th>
<th>Semester</th>
<th>Project</th>
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<tr>
<td>First Year</td>
<td>Fall Semester</td>
<td>Full Faculty Critique</td>
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<td>Spring Semester</td>
<td>Full Faculty Critique</td>
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<td>Turn in Program of Study to School of Graduate Studies for Approval</td>
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<td>Form Thesis Committee Review</td>
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<tr>
<td>Second Year</td>
<td>Fall Semester</td>
<td>First Thesis Committee Review</td>
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<td></td>
<td>Spring Semester</td>
<td>Second Thesis Committee Review or Continued Program Enrollment</td>
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**Candidacy for the Degree**

Admission of a student to the School of Graduate Studies as a degree student in Approved Status implies only that the student has met the minimum entrance requirements and will be permitted to take graduate courses that normally may be expected to lead to a degree. The student has not been admitted as a candidate for a degree. Advancement to candidacy is granted only after the completion of specific requirements and upon the recommendation of the faculty advisory committee. Candidates for the MFA degree will not be permitted to graduate in the same semester or summer session in which they are advanced to candidacy.

Students in Approved Status may be advanced to candidacy for a MFA degree when they have satisfied the following requirements in approximately the following sequence:

1. Completion of the first comprehensive review by the candidate’s graduate thesis committee. During the course of study, all MFA students will be evaluated twice and recommendations will be made regarding continuation in the degree program. The first review, held near the end of the second semester or the beginning of the third, is conducted by a graduate thesis committee of three members from the Graduate Faculty of the Department of Art and Design. After formal review of the student’s work, the committee prepares a written summary of the results of the evaluation and a recommendation regarding the continuance of the student. A copy of the evaluation is sent to the School of Graduate Studies.
2. Program of Study should normally be approved no later than the beginning of the third semester of enrollment.
3. Completion of a substantial portion of the course work for the degree with an overall GPA of no less than 3.00.
4. Completion of the second committee review prior to the end of the semester preceding the semester in which the student expects to graduate (normally the third or the beginning of the fourth semester). The evaluation will be conducted by the student’s graduate thesis committee and will consist of a review of the student’s progress toward completion of degree requirements, and a review of plans for the professional exhibition and Artist Lecture. The results of the evaluation will be filed with the School of Graduate Studies and will include a recommendation regarding advancement to candidacy for the MFA degree.
5. Recommendation to the Dean of the School of Graduate Studies for advancement to candidacy by the graduate thesis committee.

**Final Evaluation**

The graduate thesis committee will examine and evaluate the student’s performance in the Professional Exhibition and Artist Lecture, and report the results to the School of Graduate Studies on the form titled “Final Report on Candidate” by the deadline specified in the Academic Calendar. The Thesis Committee Chairperson will certify receipt of an image portfolio and/or documentation on USB drive of the Exhibition.

**Arts and Sciences Courses**

A&S 599. Special Topics. 1-4 Credits. Repeatable.

**Atmospheric Sciences Courses**

- M.S. in Atmospheric Sciences (p. 332)
- Ph.D. in Atmospheric Sciences (p. 332)
Courses

ATSC 500. Introduction to Atmospheric Research. 1 Credit.
This course is required for all Atmospheric Science graduate students. A course in the methodology and philosophy of doing research in the atmospheric sciences. Also includes discussion of related topics, including creativity, publication, science and society, and career-related activities. S/U grading.

ATSC 505. Advanced Atmospheric Dynamics. 4 Credits.
A graduate level course in linear perturbation theory, atmospheric oscillations, hydrodynamic instability and the life cycle of extratropical cyclones. F.

ATSC 510. General Circulation. 3 Credits.
Covers the large scale dynamical processes in the atmosphere, including the observed circulation, processes that maintain the circulation, mid-latitude wintertime circulation anomalies, large scale structure of the tropical atmosphere, and the stratosphere and its link to the troposphere. Prerequisite: ATSC 505.

ATSC 515. Advanced Climatology. 3 Credits.
A course on climate from the perspective of utilizing climatic knowledge and information to examine the current state of the climate and how this can be used to explore potential future states. Topics included are an introduction to climatology, basic data and their analysis, climatological analysis, statistical methods, applications and synoptic climatology. Prerequisite: ATSC 540.

ATSC 518. Advanced Synoptic Meteorology. 3 Credits.
Advanced analysis of atmospheric processes important to large-scale flows. Quasigeostropic and semi-geotropic theory, behavior of extratropical systems, fronts and jets, geotropic adjustment, blocking and IPV thinking. Prerequisite: ATSC 505 or equivalent.

ATSC 520. Atmospheric Chemistry. 3 Credits.
Composition of clean and polluted air. Sources and sinks of atmospheric gases and aerosols. The role of atmospheric chemistry in global environmental issues such as acid rain, visibility reduction, climatic change, oxidant enhancement, etc.

ATSC 525. Atmospheric Radiation. 3 Credits.

ATSC 528. Atmospheric Data Analysis. 3 Credits.
Introduction to techniques used in the analysis of meteorological data and methods for interpreting their effects: polynomial fitting, method of successive corrections, statistical methods, variational techniques, model initialization, data assimilation, and filter design. Prerequisite: Proficiency in a programming language.

ATSC 530. Numerical Weather Prediction. 3 Credits.
Covers scale analysis in atmospheric prediction; numerical methods; various atmospheric prediction models; the use of filtering, smoothing, interpolation, weighting and adjustment in objective analysis techniques; numerical forecasting; current NWP structures and applications. Prerequisite: ATSC 505.

ATSC 532. Cloud Microphysics Parameterization & Simulation. 3 Credits.
A study of how cloud microphysics processes are parameterized within weather models. Includes a review of the theoretical basis of cloud physics processes, hands-on examination of the parameterization assumptions and their impacts, and analysis and display of model output. Course offered every four years. On demand.

ATSC 535. Measurement Systems. 3 Credits.
An advanced course in meteorological measurement systems, including coverage of performance characteristics of sensors, calibration standards, measuring devices, the effects of making measurements in the atmospheric environment, meteorological measurement systems, and digital data logging and processing.

ATSC 538. Advanced Earth System Sciences. 3 Credits.
Introduction and synthesis of understanding of the components of the Earth system, their interactions, and the consequences of changes in the Earth system for life; identify and quantify Sun-Earth connections associated with solar variability and impact on the Earth System; explore interactions among the major components of the Earth system: continents, oceans, atmosphere, ice, and life; distinguish natural from human-induced processes; understand and predict the consequences of change; and consider analysis techniques, with emphasis placed on numerical modeling of phenomena. Prerequisite: Permission of instructor.

ATSC 540. Statistical Methods in Atmospheric Science. 3 Credits.
A course on statistical methods used to describe, analyze, test, and predict atmospheric phenomena. The topics will review basic statistical concepts, statistical data interpretation, theoretical probability distributions, hypothesis testing, uncertainty analysis, regression, time series analysis, and statistical weather prediction and verification. Prerequisite: Must have completed course work in statistics or consent of instructor.

ATSC 545. Hydrometeorology. 3 Credits.
A course designed to study the coupling of atmospheric and hydrologic processes. Topics will cover basic hydrologic concepts, review of atmospheric thermodynamics, atmospheric moisture, precipitation processes, hydrologic cycle, evaporation/evapotranspiration, infiltration, snow and snowmelt processes, runoff mechanisms, land surface processes, and hydrologic modeling.

ATSC 548. Advanced Mesoscale Dynamics. 3 Credits.
An in-depth theoretical and analytical examination of mesoscale convective processes, initiation and characteristics; mesoscale features of tropical systems; orographically-forced and -influenced circulations; local and regional circulations; high-latitude mesoscale systems; an introduction to mesoscale model design, parameterization development, and evaluation. Prerequisite: Upper division or graduate course in dynamics or constant of instructor; ATSC 505 is a recommend corequisite but not required.

ATSC 550. Tropical Meteorology. 3 Credits.
A study of tropical phenomena over a range of scales, including small scale (cumulus clouds, thunderstorms), mesoscale (sea breezes, squall lines), large scale (waves and cyclones), and planetary scale circulations (trade winds, equatorial trough, equatorial waves, monsoons, intraseasonal oscillations, ENSO). Methods for obtaining and using information to study tropical phenomena are examined. Prerequisite: Graduate standing.

ATSC 552. Satellite Meteorology. 3 Credits.
A study of remote sensing technologies for atmospheric applications. Topics include basic radiation and remote sensing methods, image data processing, atmospheric and geometric corrections, radiometric and geometric enhancements, image classification, and selected meteorological applications using satellite remote sensing. S, even years.

ATSC 553. Advanced Satellite Meteorology. 3 Credits.
Addresses advanced topics in satellite meteorology. Includes advanced topics in radiation, scattering by molecules and particles, and retrieval theory and methods for meteorological applications using passive and active satellite remote sensing. Prerequisites: ATSC 552 and ATSC 525. F. even years.

ATSC 555. Advanced Surface Transportation Weather. 3 Credits.
Addresses weather research topics in contemporary surface transportation. Includes maintenance decision support systems construction, applications of artificial intelligence methods, and investigation of land surface effects and applications of advanced mesoscale weather prediction modeling in a surface transportation environment. Prerequisite: ATSC 510 or consent of instructor.

ATSC 560. Boundary Layer Meteorology. 3 Credits.
The interaction of the atmosphere with the earth's surface. The transfer of heat, moisture, and momentum between the atmosphere and the underlying surface. The description of turbulence and the effects of turbulence on the transfer properties of the atmosphere. Prerequisite: ATSC 505.

ATSC 565. Air Quality. 3 Credits.
An in-depth introduction to important areas within the air quality field. Topics covered include the physical and chemical nature of air pollutants; their sources, control, and transport through the atmosphere; their interaction with other atmospheric constituents; their removal through cloud processes, fallout and wet deposition; their effects on visibility, human health, ecosystems, and global climate. Methods related to the measurements of atmospheric pollutants, air quality modeling, and air quality forecasting are discussed. Prerequisites: CHEM 121 or equivalent, and PHYS 251 or equivalent.

ATSC 570. Seminar. 1 Credit.
A discussion course on current research topics and publications related to the field of atmospheric sciences. Students, faculty and guest speakers will present their research and lead the discussion during seminar. Repeatable to 3 credits. Repeatable to 3 credits. S/U grading.

ATSC 575. Current/Special Topics in Meteorology. 3 Credits.
A course in specific advanced topics in atmospheric sciences. Largely delivered in a structured, lecture format. Repeatable to 12 credits. Repeatable to 12 credits.
ATSC 594. Independent Studies. 2-4 Credits.
Survey investigations, literature searches and/or preliminary research topic of interest to the student. Repeatable to 4 credits. Repeatable to 4 credits.

ATSC 596. Supervised Research. 1-4 Credits.
Research in consultation with departmental faculty. Repeatable to 12 credits. Prerequisites: Master’s degree student and consent of the instructor. Repeatable to 12 credits. S/U grading.

ATSC 598. Dissertation Research. 1-8 Credits.
Research, in support of the doctoral dissertation, performed in consultation with the student’s advisor. Repeatable to 15 credits. Prerequisite: Consent of the instructor. Repeatable to 15 credits. S/U grading.

ATSC 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

This course is required for all Atmospheric Science graduate students enrolled in the non-thesis option. Students will be required to independently investigate a topic related to the major field. This study need not be an original contribution to knowledge, but may be a presentation, analysis, and discussion of ideas already in the literature of the field. Prerequisite: Students are required to complete at least one course from each of the core areas: dynamics, physical, earth system, and tools, as well as ATSC 500. S/U grading. F,S,SS.

ATSC 998. Thesis. 1-6 Credits.
Repeatable to 9 credits. Repeatable to 9 credits.

ATSC 999. Dissertation. 1-9 Credits.
Repeatable to 18 credits. Repeatable to 18 credits.

Undergraduate Courses for Graduate Credit

ATSC 441. Radar Meteorology. 4 Credits.
Advanced radar theory, including basic radar principles, digital processing of radar signals, Doppler radar principles, displays, polarization techniques, and characteristic returns. Includes laboratory. Prerequisite: ATSC 345 or consent of instructor. S, odd years.

ATSC 450. Introduction to Cloud Physics Meteorology. 4 Credits.
A study of the physics of clouds with emphasis on microphysical processes involved in cloud formation, precipitation production, and dissipation. Includes Laboratory. Prerequisites: ATSC 350 and ATSC 353. F, odd years.

Doctor of Philosophy in Atmospheric Sciences

Admission Requirements

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog. In addition, students must fulfill the requirements below for admission to the Atmospheric Sciences doctoral degree program.

1. A bachelor’s or master’s degree from a recognized institution. For U.S. degrees, accreditation must be by one of the six regional accrediting associations.
2. A cumulative GPA of at least 3.00 for all undergraduate work.
3. A GPA of at least 3.00 in all graduate level work.
4. A combined score of 300 in the quantitative and verbal sections of the Graduate Record Examination (GRE).
5. Be recommended for doctoral work by the department.
6. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.
7. Students with a bachelor’s degree may apply directly to the Ph.D. program and must include within their application:
   a. At least one letter of recommendation that comments on their research ability, and
   b. A sample of their previous research, or, provide a research topic proposal and how that research will be executed, completed, and presented within the first year of the Ph.D. program.
8. In rare circumstances, students who begin the M.S. program in Atmospheric Sciences may bypass the M.S. and be admitted into the Ph.D. program with a unanimous recommendation by the departmental faculty and by first satisfying all other Ph.D. admission requirements of the UND School of Graduate Studies and Atmospheric Sciences Department including #7 above. Application materials should be submitted to the Graduate Committee in the Department of Atmospheric Sciences. The student need not have completed their M.S coursework at the time of application. The student would then be subject to the additional degree requirements stated in section 6 of “Degree Requirements” below.

Degree Requirements

Students seeking the Doctor of Philosophy degree through the Department of Atmospheric Sciences at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Department of Atmospheric Sciences. These degree requirements include:

1. Completion of 90 semester credits beyond a bachelor’s degree or 60 semester credits beyond a master’s degree.
2. Two consecutive years of full-time academic work completed in residence at the University of North Dakota campus. With approval of a student’s Faculty Advisory Committee, one of these years may be completed through full-time academic work and/or research at another institution or location.
3. At least 40 of the post-bachelor’s credits or 27 of the post-master’s credits must be formal coursework. A minimum of two-thirds of these credits must be taken in the Atmospheric Sciences department.
4. Up to 9 credits may be taken through distance education.
5. Completion of ATSC 500 Introduction to Atmospheric Research and ATSC 505 Advanced Atmospheric Dynamics or equivalent classes.
6. Students who have been admitted under admission requirements #7 or #8 above must successfully present research in written and oral form during their first year of the Ph.D. program, subject to approval by the Departmental Graduate Committee and the student’s Doctoral Committee. Those students approved will finish coursework and progress toward comprehensive exams and Ph.D. candidacy while those not approved will be dismissed.
7. Satisfactory completion of a written and oral doctoral comprehensive examination in Atmospheric Sciences is required before advancement to Ph.D. candidacy is granted. Students may attempt the written comprehensive exam twice.
8. Students are required to complete independent research that culminates in a dissertation, a public departmental seminar, and final examination.

Master of Science in Atmospheric Sciences

Admission Requirements

1. A four-year bachelor’s degree from a recognized college or university. For U.S. degrees, accreditation must be by one of the six regional accrediting associations.
2. Completion of a minimum of 20 semester credits of appropriate undergraduate work, e.g., physics, mathematics, chemistry, engineering, and/or atmospheric science.
3. A cumulative GPA of at least 2.75 for all undergraduate work or a GPA of at least 3.00 for the last two years.
4. Scores on the general portion of the Graduate Record Examination (GRE).
5. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as listed in the graduate catalog.

Applicants will be evaluated on an individual basis and those with limited backgrounds in the aforementioned areas (physics, mathematics, chemistry, and atmospheric science) but with a distinguished record in other disciplines may be accepted on a qualified basis with the understanding that deficiencies would be remedied early in the program.

Degree Requirements

Students seeking the Master of Science degree through the Department of Atmospheric Sciences at the University of North Dakota must satisfy all general degree requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Department of Atmospheric Sciences.
The Master of Science program requires that students complete a minimum of 30 credit hours. Approval of the thesis option will be granted based upon alignment of research interests with departmental faculty’s research interests and faculty availability. The non-thesis option requires the student to independently investigate a topic related to the major field and successfully complete a written comprehensive examination. This study need not be an original contribution to knowledge, but may be a presentation, analysis, and discussion of ideas already in the literature of the field. This non-thesis requirement ensures that students can investigate a topic and organize a scholarly report.

**Required Courses:** All students are required to complete at least one course from each of the core areas listed below in addition to completing ATSC 500 Introduction to Atmospheric Research. Non-thesis option students must also complete two credits of ATSC 997 Independent Study Report (Non-Thesis Option), and thesis option students must also complete 4-9 credits of ATSC 998 Thesis. A minimum of 21 credits must be from classroom courses (ATSC 575 or lower) for the thesis option and a minimum of 24 credits for the non-thesis option.

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<tr>
<th>Course</th>
<th>Title</th>
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<tr>
<td>ATSC 500</td>
<td>Introduction to Atmospheric Research</td>
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<td>ATSC 505</td>
<td>Advanced Atmospheric Dynamics</td>
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<td>ATSC 518</td>
<td>Advanced Synoptic Meteorology</td>
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<tr>
<td>ATSC 548</td>
<td>Advanced Mesoscale Dynamics</td>
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<td>ATSC 450</td>
<td>Introduction to Cloud Physics Meteorology</td>
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<td>ATSC 520</td>
<td>Atmospheric Chemistry</td>
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<td>ATSC 525</td>
<td>Atmospheric Radiation</td>
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<tr>
<td>ATSC 555</td>
<td>Advanced Surface Transportation Weather</td>
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<td>ATSC 560</td>
<td>Boundary Layer Meteorology</td>
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<td>ATSC 565</td>
<td>Air Quality</td>
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<td>ATSC 510</td>
<td>General Circulation</td>
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<td>ATSC 515</td>
<td>Advanced Climatology</td>
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<td>ATSC 538</td>
<td>Advanced Earth System Sciences</td>
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<td>ATSC 545</td>
<td>Hydrometeorology</td>
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<tr>
<td>ATSC 550</td>
<td>Tropical Meteorology</td>
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<tr>
<td>ATSC 441</td>
<td>Radar Meteorology</td>
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<tr>
<td>ATSC 530</td>
<td>Numerical Weather Prediction</td>
</tr>
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<td>ATSC 535</td>
<td>Measurement Systems</td>
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<tr>
<td>ATSC 540</td>
<td>Statistical Methods in Atmospheric Science</td>
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<td>ATSC 552</td>
<td>Satellite Meteorology</td>
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<tr>
<td>ATSC 553</td>
<td>Advanced Satellite Meteorology</td>
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<td>ATSC 997</td>
<td>Independent Study Report (Non-Thesis Option)</td>
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<tr>
<td>ATSC 998</td>
<td>Thesis</td>
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**Courses taken at the undergraduate level cannot be repeated for graduate credit.**

**Combined Degree Program B.S./M.S. in Atmospheric Sciences**

The Atmospheric Sciences program offers a combined B.S./M.S. in Atmospheric Sciences program. The intent of the combined program is to allow qualified students to complete the requirements for both degrees in one year beyond that required to receive the Baccalaureate degree. Students may be accepted into this program upon completion of 90 credits toward the Bachelor’s degree and must apply prior to their fourth year of academic work. All requirements for both degrees must be met, and up to eight credits of prior-approved coursework may be double-counted toward each of the two degrees. Double-counted credits may not include required courses for the B.S. degree, but may include appropriate elective coursework.

**Admission Requirements**

Admission requirements for the M.S. in Atmospheric Sciences, with the following additional criteria:

1. 3.0 GPA overall.
2. Completion of 90 credit hours prior to year four, including a course in dynamic meteorology.

**Degree Requirements**

Degree requirements for the M.S. in Atmospheric Sciences, with the following additional criteria:

1. Up to 8 credits of graduate-level coursework can be double counted for the B.S. and M.S. degrees. These credits can only be taken after admission to the graduate program.
2. The B.S. and M.S. degrees will be awarded sequentially upon completion of the degree requirements.

**Aviation**

M.S. in Aviation (p. 337)

**AVIT Courses**

**AVIT 501. General Issues in Aviation/Aerospace. 3 Credits.**
This course is designed to introduce students to graduate school, library resources, and faculty research interests. Students will explore the historical, current and future issues related to their own interest areas in the aerospace industry. F,S.

**AVIT 502. Aviation Economics. 3 Credits.**
An in-depth examination of the economic aspects of the air transportation industry, with microeconomic analysis applied to decision making in the airline, general and corporate aviation, and airports. Topics include: basic economics of air transport supply and demand; demand forecasting; cost drivers; yield, revenue and capacity management; regulatory issues; political influences; and unique economic characters of international commercial aviation.

**AVIT 503. Statistics. 3 Credits.**
This course is an in-depth study of inferential statistics with emphasis on the analysis of variance models and subsequent comparison procedures. In addition, the course will include coverage of correlation and multiple regression techniques as data analytic tools. Also, coverage of survey construction and analysis of survey data will be presented. Course content will be presented within the context of aviation and psychology examples. (Psychology 541: Advanced Univariate Statistics can be substituted for AVIT 503). Prerequisite: An introductory statistics course or calculus course.

**AVIT 504. Research Methods. 3 Credits.**
Methods and procedures of development, design and analysis related to aviation industry research. Topics include problem identification, review of literature, research design, and data analysis. This course is designed to give an overview of quantitative, qualitative and mixed-method approaches research design. The course includes the experience of critically evaluating research projects and developing a research project based on the principles discussed in class. Prerequisites: AVIT 501, and AVIT 503 or PSYC 541. F.

**AVIT 505. Qualitative Research Methods. 3 Credits.**
Examination and analysis of qualitative research design with particular emphasis on approaches relevant to problems in Aerospace Studies or related fields. Students will design a qualitative research project. Prerequisite: A graduate level Statistics course.

**AVIT 507. Advanced Research Methods. 3 Credits.**
This course will be a thorough discussion of the different methodologies utilized in theoretical and applied research. Experimental and quasi-experimental design, and topical areas of survey methodology data mining, simulations, and techniques for dissertation designs. Prerequisites: AVIT 503, AVIT 505, and AVIT 506.
AVIT 510. Aviation Public Policy and Regulations. 3 Credits.
This course will examine and discuss the initiation, formulation and implementation of public policies that affect the various segments of the aviation industry. Various regulatory areas within the aviation industry, such as scheduled air carriers, general aviation, airport operations, air traffic management, and international agreements, will be analyzed. On demand.

AVIT 511. Aviation Information Technology. 3 Credits.
This course is an introduction to information systems essential to an aviation business professional. It will provide an overview of current and emerging technologies in various database, data communication and e-commerce systems.

AVIT 512. Aviation Environmental Issues. 3 Credits.
This course examines current environmental issues within the aviation industry in the context of historical environmentalism, current laws and regulations, and emerging research findings. A broad survey of earth systems precedes a focused examination of contemporary aviation environmental issues.

AVIT 513. Aviation Safety Management Systems. 3 Credits.
An in-depth study of aviation safety management concepts and principles as they relate to effective safety programs within the airlines, corporate aviation, general aviation and airports.

AVIT 514. Aviation Management Theory. 3 Credits.
An in-depth review of organizations in the aviation industry, their structures, environments and leadership as it relates to human behavior. Topics include organizational design, climate and the interactions with individuals, groups, and different organizational structures within the airline, general aviation, corporate aviation and airport organizations.

AVIT 515. Human Factors and Ergonomics: Human Perceptions in Information Systems Design. 3 Credits.
Human perception and information processing will be discussed in relation to information system design requirements to optimize human performance. The Ergonomics components will highlight human-centered design of equipment, devices and processes that conforms to the human body (anthropometry) and its cognitive abilities within the aviation/aerospace environment. Topics include information systems design with regard to compatibility, perception, attention, situation awareness and decision processes. Applications to current workstation design will allow students to have a greater understanding of human centered design goals. On demand.

AVIT 516. Training System Design. 3 Credits.
The process of memory, learning, and judgment will be related to instructional design strategies in the aviation industry, where heavy use of simulation is used in the training and evaluation of aviation professionals. Topics include instructional design and assessment concepts, simulation design and decision making skills. Class presentations include operational problem-solving group work as well as research paper reviews.

AVIT 517. Airline Labor Relations and Law. 3 Credits.
This course will examine and discuss the application and impact of the Railway Labor Act as it pertains to air carrier labor operations. Topics of study will include labor history, organization, alternative dispute resolution, collective bargaining, and emerging labor trends. On demand.

AVIT 518. Human Error. 3 Credits.
The objective of this course is to develop a deeper understanding of the human error and its impact upon human performance in variety of fields. Prerequisite: Graduate Admission. S.

AVIT 520. Strategic Airport Planning. 3 Credits.
This course will explore the elements of airport planning within the public administration domain. Emphasis will be placed on individual airport's strategic plans, how airports operate efficiently and effectively with changing regulations and economic fluctuations in the global marketplace.

AVIT 521. Ethics in Aerospace. 3 Credits.
The course will introduce ethical concepts and frameworks used in professional decision-making. Students will engage with faculty and outside speakers to weigh decisions in the applicable ethical frameworks. Students participation will include graded elements of formal case presentations, class discussion sessions, essay examinations and review of scholarly and trade journal articles. The course will have a strong emphasis on research project design to assess dynamics of ethical decision-making in different populations, as well as exploring educational opportunities in the aerospace industry.

AVIT 522. UAS Management. 3 Credits.
This course provides a series of lectures or presentations by visiting lecturers or faculty on various themes related to Unmanned Aircraft Systems (UAS). Prerequisite: Graduate Student Status. F, odd years.

AVIT 523. Aviation Safety Data Analysis. 3 Credits.
The objective of this course is to obtain an understanding of various safety programs conducted throughout the aviation industry and examine the underlying analytical techniques associated with each program. Prerequisite: Graduate student status. SS.

AVIT 524. Air Traffic Management. 3 Credits.
This course will explore the elements of Air Traffic and Next Gen. There will be a discussion on how air traffic control works and the evolution of the Air Traffic Management of the National Airspace System in the US and abroad. Emphasis will be on the current day issues and how Air Traffic Management is changing not only in the US but in Canada, Europe and worldwide. Prerequisite: Admission (or conditional admission) to the Aviation Master of Science, The Aerospace PhD program, or consent of the instructor. S, odd years.

AVIT 525. Legal Issues in Aviation. 3 Credits.
The course will introduce legal concepts and frameworks of the United States’ legal system. Issues particular to the aviation industry will be discussed. Students will engage in formal case presentations and discussions to gain an understanding of the legal issues faced in the aerospace industry. Prerequisite: Admission (or conditional admission) to the Aviation Master of Science program, the Aerospace PhD program, or consent of the instructor. SS, even years.

AVIT 526. UAS and the Law. 3 Credits.
This course introduces students to the laws and policies governing UAS operations including flight regulations, remote sensing issues, and data and cybersecurity issues related to UAS. The class scope of inquiry includes US and international law and examines both civil and military use. On demand.

AVIT 587. Supervised Field Work. 1-3 Credits.
Used primarily for individualized field placement so that the student may acquire practical experiences in the aviation industry. Prerequisite: Consent of graduate director. Repeatable to 6 credits. S/U grading.

AVIT 590. Aviation Seminar. 1-3 Credits.
A series of lectures presented by visiting lecturers and the faculty. Repeatable to 9 credits.

AVIT 591. Readings in Aviation. 1-3 Credits.
Readings in selected Aerospace Studies topics, with written and/or oral reports. Prerequisite: Consent of instructor. Repeatable to 6 credits.

AVIT 593. Individual Research in Aviation. 1-3 Credits.
Individual student projects designed to develop advanced knowledge in a specific area of expertise. A written report is required. May be repeated for up to 6 credits for Master's and up to 12 credits for Ph.D. Repeatable to 6 credits.

AVIT 595. Aviation Capstone. 3 Credits.
The Capstone course integrates, extends and applies knowledge learned in earlier Aviation courses and research projects. The course also undertakes an in-depth study of management theories relevant to the aviation industry and how leaders apply these theories in practice. Students will have the opportunity to demonstrate their knowledge and leadership abilities by working in teams to design and develop a solution to a current aviation problem, which will be assigned by the instructor. This effort will culminate in an on-campus presentation to the faculty and invited industry experts. Prerequisite: AVIT 504 or permission of instructor.

AVIT 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

AVIT 997. Independent Study. 2 Credits.
Independent study and preparation of a written report. Prerequisite: Special Permission Only. On demand.

AVIT 998. Thesis. 4 Credits.
Preparation and defense of a thesis based on original research. Prerequisite: Admission committee approval and consent of instructor. Repeatable to 4 credits.

AVIT 999. Dissertation. 1-12 Credits.
An original research project approved by and completed under the supervision of a dissertation committee. Prerequisites: Graduate standing, approval, completion, and defense of dissertation proposal. Repeatable to 18 credits.
SPST Courses

SPST 500. Introduction to Orbital Mechanics. 3 Credits.
This course introduces students without much background in either mathematics or physics to the problems faced everyday by orbital analysts as they track the 7000 satellites which orbit the earth. The course gives the students an ability to converse, as managers and co-workers, with those individuals who are calculating these difficult orbits. This appreciation is important in both the civilian and military sides of the space program. On demand.

SPST 501. Survey of Space Studies I. 3 Credits.
SPST 501 is the first course in a two-course sequence (along with SPST 502) in Space Studies that introduces new students to essential knowledge that will be necessary to successfully complete their M.S. degree in space studies. SPST 501 consists of the following six modules: 1) space history, 2) space policy, 3) space law, 4) planetary and space sciences, 5) space life sciences and human factors, and 6) Earth remote sensing. All modules contain foundational information that will give students the basic knowledge and skills necessary to achieve a broad understanding of the multi- and interdisciplinary nature of space studies; knowledge that can be applied in later courses, such as Capstone; and knowledge that facilitates thesis and other specialized types of instruction and research. Course content in SPST 501 will also be used to assess student learning at the end of their M.S. program via the Comprehensive Examination. Students are expected to master and understand course content, be able to apply course content as appropriate, and demonstrate their understanding of course content prior to graduation.

SPST 502. Survey of Space Studies II. 3 Credits.
SPST 502 is the second course in a two-course sequence (along with SPST 501) in Space Studies that introduces new students to essential knowledge that will be necessary to successfully complete their M.S. degree in space studies. SPST 502 consists of the following five modules: 1) space mission design (two modules), 2) orbital mechanics, 3) launch vehicles and propulsion, and 4) robotic spacecraft instrumentation. All modules contain foundational information that will give students the basic knowledge and skills necessary to achieve a broad understanding of the multi- and interdisciplinary nature of space studies; knowledge that can be applied in later courses, such as Capstone; and knowledge that facilitates thesis and other specialized types of instruction and research. Course content in SPST 502 will also be used to assess student learning at the end of their M.S. program via the Comprehensive Examination. Students are expected to master and understand course content, be able to apply course content as appropriate, and demonstrate their understanding of course content prior to graduation.

SPST 504. Research Methods in Space Studies. 3 Credits.
This course will provide an introduction to research in Space Studies, emphasizing the preparation of a Ph.D. proposal and the dissertation itself. Course content will be tailored to address the specific research methods applicable to the student(s) research interests. Typically given by the student's advisor, but students preparing in the same area (e.g., Planetary Science, Astronomy) may be in a combined section. On demand.

SPST 505. Spacecraft Systems Engineering. 3 Credits.
This course will guide the students through the spacecraft design and proposal process for an actual mission. In this course the students will work in teams on individual spacecraft subsystems, participate in an engineering design review, and create a document which can be submitted for funding for a small satellite project. Lectures will provide an overview of the separate spacecraft subsystems involved in a typical mission, the systems engineering approach to spacecraft development, and the grant writing process. Distance students will interact with on-campus students via conferencing software. Prerequisite: SPST 405 or consent of instructor.

SPST 506. Advanced Orbital Mechanics. 3 Credits.
This course provides a working knowledge of the field of orbital mechanics including the use of appropriate mathematical and computational techniques, the analysis of professional papers in orbital mechanics, and applying the appropriate techniques to solve orbital mechanics problems. Topics covered include orbital elements, perturbations, coordinate systems, orbit determination, and multi-body gravitational problems. Prerequisites: SPST 500, and MATH 266 or equivalent.

SPST 508. Quality Engineering for the Space Industry. 3 Credits.
This course addresses the principles and techniques for establishing quality goals, identification of customer needs and requirements, measurement of quality, and product/process engineering to improve system performance with a focus on the space industry. The main objectives are to provide the student with an understanding of the principles and practice of quality and reliability engineering in general and to provide an in-depth understanding of the quality assurance concepts, strategies, and tools practiced in the space industry. Familiarity with the techniques learned in this course will enable the student to address problems in the design, implementation, measurement, and correction of production and service systems found in the space industry. On demand.

SPST 512. Human Performance in Extreme Environments. 3 Credits.
This course identifies the impact that the stressors of extreme environments have on human performance. The course objectives are to highlight the differences and similarities among extreme environments and to demonstrate that, despite the differences lessons learned from operations in a given extreme environment can be effectively applied to other environments. Although settings such as space, mountains, or deep sea exhibit unique characteristics, the human physiological and psychological reactions and adaptations to these extreme settings stay similar. On demand.

SPST 515. Human Factors in Space. 3 Credits.
This course is a review of the major stresses experienced by humans on entering the space environment. The course objectives include investigation of the psychological and physiological effects experienced by U.S. and Russian space crews, with an emphasis on longer flights. The examination of the avoidance and mitigation of these stresses is an essential need in the future development of human spaceflight. On demand.

SPST 517. Human Spaceflight Systems. 3 Credits.
This course is designed to introduce students to human space systems. The course uses both an engineering and a historical approach to human spaceflight systems covering all manned spacecraft up to today, plus individual subsystems necessary for human occupation. By the end of the course, students will: 1. Understand the engineering and science concepts related to human spaceflight, 2. Understand the major technologies required for human spaceflight, 3. Apply the systems engineering process to a human spaceflight mission: a. Describe the interactions among the elements of a space mission, b. Describe the interactions among all spacecraft subsystems, c. Document design decisions and analysis in a clear and concise manner, F. even years.

SPST 519. Closed Ecological Systems for Life Support. 3 Credits.
The course covers the multiple interactions of human/bioregenerative life support based on physical/chemical regeneration (hybrid) life support environments. The course devotes specific attention to the limits of stability for closed material cycles functioning during long-term remote confined missions. The importance of the human factor as a target link, main sensor, and main integration and control element for the system is considered as providing significant self-sustainability. Advanced scenarios for space life support based on ecological and in situ resource utilization approaches are discussed. On demand.

SPST 520. Asteroids, Meteorites and Comets. 3 Credits.
The small bodies of the solar system provide clues to the origin and early history of the solar system. The planets and larger moons have all been chemically transformed erasing their records of their formation. By contrast, many asteroids, meteorites and comets are essentially unmodified from the time of their origin 4.5 billion years ago and thus preserve a record of the formation epoch. Each of these classes of objects is investigated separately, and relationships between them are examined. Implications for impact hazards and for extraterrestrial resources are also explored. The results of recent and current spacecraft missions to asteroids (e.g., Galileo, NEAR, DAWN, Hayabusa, Rosetta, OSIRIS-Rex, etc.) and to comets (e.g. Giotto, Vega 1, Stardust, Deep Impact, Rosetta, etc.) are reviewed. On demand.
SPST 521. The Planet Mars. 3 Credits.
This course provides an in-depth review of the present state of our knowledge of the planet Mars. Topics that are covered include: the origin and evolution of the planet, the surface geology and geological processes, the geophysical properties of the Martian interior, the origin and evolution of the Martian atmosphere, the present and past climates of Mars, the Martian moons, and the possibility of past or present life on Mars. The American, Soviet/Russian and other nations' Mars exploration programs are reviewed and the course incorporates the most recent results from spacecraft missions such as Mars Odyssey, the Mars Exploration Rovers (Opportunity Spirit), Mars Express (European Space Agency), Mars Reconnaissance Orbiter, Mars Science Laboratory (Curiosity Rover), MAVEN, and Mangalyaan (India's Mars Orbiter Mission). Potential future manned and unmanned missions are also discussed. On demand.

SPST 522. Remote Sensing Principles. 3 Credits.
This course covers the basic concepts and foundations of remote sensing, a review of major Earth observing satellite and aircraft platforms, and an investigation of flow of data from satellite to Earth, what it represents, and how to interpret it, using both visual and digital image processing techniques. A field visit to the EROS Data Center in Sioux Falls may also be arranged.

SPST 523. Remote Sensing Applications. 3 Credits.
This course covers the use of advanced image processing algorithms and information extraction techniques for various Earth resource applications such as land cover/land use, environmental change detection, geology, oceanography, agriculture, forestry, rangeland, water resources, urban planning, natural disaster management, etc. Prerequisite: SPST 522.

SPST 524. Current Topics in Astrobiology. 3 Credits.
This is a multi-disciplinary, literature-intensive examination of astrobiology, which is the study of life in the universe. Students will read scientific research and review papers from a variety of disciplines including astronomy, planetary science, chemistry, biology, and geology. Course goals include: developing proficiency at reading/analyzing diverse scientific papers, developing the ability to incorporate knowledge from multiple disciplines in the study of astrobiological research, and developing the ability to effectively write summary papers to show basic understanding of course material. Prerequisite: SPST 460 or consent of instructor. On demand.

SPST 525. Technical Issues in Space. 1-3 Credits.
An examination of the technological base for the exploration and development of space. An understanding of this technology and of its impact is essential to an understanding of the issues and problems associated with our continuing efforts to explore and settle this new frontier. May be repeated if the topic is different. Repeatable.

SPST 526. Advanced Observational Astronomy. 3 Credits.
An advanced course that utilizes UND Observatory's full wavelength range capabilities to obtain data from a variety of celestial objects with the key goal of learning appropriate ways to reduce and interpret observational data. In particular, the course will focus on visible-wavelength stellar spectroscopy, near-infrared reflectance spectroscopy, solar astronomy, radio astronomy, and color imaging. Students will also engage in reading professional literature for each sub-discipline and prepare a mock publication using data obtained during the course. Learning outcomes and objectives for this course include: 1) Students will be able to locate and observe astronomical objects and reduce data, 2) Develop analytical skills and the ability to interpret observational data, 3) Gain experience with measurement techniques and equipment, and develop the ability to assess uncertainties and assumptions, 4) Communicate professionally, in writing, the results of their observational endeavors, and be able to understand scientific ideas by reading published professional journal articles, 5) Students will be able to understand scientific ethical practices and demonstrate them in the conduct of scientific research, and 6) Students will be able to conduct astronomical research under the direction of the professor, which will ultimately contribute to the generation of new knowledge as it will prepare them to do this professionally. Prerequisites: SPST 425 and MATH 165 or consent of instructor. On demand.

SPST 527. Extraterrestrial Resources. 3 Credits.
This course focuses on the inventory, accessibility, acquisition, processing and utilization of extraterrestrial resources (space resources) from celestial bodies such as the Moon, Mars, asteroids and comets. Consideration will be given to extraterrestrial resources for in situ utilization (such as a Lunar or Martian base), for space operations (such as supporting large scale near-Earth activities or a human Mars mission), and for terrestrial markets. The course will focus on the interplay between the scientific, technical, and economic aspects of acquiring and utilizing such resources. The course will also explore some of the legal and political ramifications and limitations of claiming and recovering space resources. On demand.

SPST 528. Space Environment and the Sun. 3 Credits.
This course will provide an in-depth study of the science and observations of the Sun, space weather, and effects of the Sun on astronauts, Earth, and the space environment. Topics that will be covered include the solar photosphere and active surface phenomena such as sunspots, flares, and coronal mass ejections; the nature of the quiet Sun; the solar interior and helioseismology; space weather and impact of solar particles on the space environment and Earth; the hazards posed to astronauts by solar eruptions; common techniques of solar observations; and a review of the primary types of solar instrumentation and the observatories that currently study the Sun. Students will be able to observe the Sun using the UND Observatory's small solar telescopes; all students will have the opportunity to analyze solar datasets to aid their understanding of the Sun. Prerequisite: MATH 165 or consent of instructor. On demand.

SPST 540. Space Economics and Commerce. 3 Credits.
A study of the economic aspects of space activities, with analysis of the possibilities and the barriers. Key areas include launch services, satellite communications, remote sensing, microgravity materials processing, and interaction with the government. Global competition against subsidies or government-sponsored entities is examined. On demand.

SPST 541. Management of Space Enterprises. 3 Credits.
This course investigates the management of space organizations. These include organizations that are public and private, RD and operations, profit and non-profit. You will learn the basics of management theory, the history of systems management, and the technical issues that must be considered in the management of space RD and operations. On demand.

SPST 542. Risk Management of Space Organizations. 3 Credits.
This course includes a systematic approach to the principles and practices of risk management in the space industry from project initiation through planning, implementation, control and closeout. It discusses various techniques and models for qualitative and quantitative risk assessment and risk mitigation in such areas as cost, schedule, and performance. Decision making under conditions of uncertainty and risk is also discussed. On demand.

SPST 545. Space and the Environment. 3 Credits.
This course is an advanced graduate-level review of international relations, theories, policies, and laws as applied to the international implications of global commons. This course introduces the concept of global commons, examines the theories and practices concerning management of global commons, and analyzes the global commons dealing with the challenges of collective action as applied to global, orbital, and planetary environmental changes. On demand.

SPST 551. History of the Space Age. 3 Credits.
This course introduces students to the history of human endeavors in space. These include the development of rocketry, the influence of amateur societies and science fiction, the military development of ballistic missiles, and human and robotic spaceflight.

SPST 552. History of Astronomy and Cosmology. 3 Credits.
This course investigates the history of human endeavors to understand the stars, planets, and cosmos as a whole from a scientific perspective. It covers the early observations and theories of the Babylonians and Greeks through the European Scientific Revolution, and finally to the development of astrophysics and modern cosmology using space vehicles. On demand.

SPST 555. Military Space Programs. 3 Credits.
An introduction to military uses of space by the United States, Russia, and other nations. The course introduces ballistic missiles, anti-ballistic missile and anti-satellite systems, space-based reconnaissance and intelligence-gathering, communications, navigation, acquisition, and military space treaties. On demand.
SPST 560. Space Politics and Policy. 3 Credits.
This course serves as a graduate-level introduction to the field of Public Policy as applied to Space Policy. The course surveys the evolution of Space Policy at several levels of analysis including context, political actors and institutions, political processes, and policy outcomes, and assesses the symbiotic relationship between policy, technology, and science. On demand.

SPST 561. Public Administration of Space Technology. 3 Credits.
This course is an advanced graduate-level review of Public Administration theories as applied to the implementation of space technology programs. In this course, the political, organizational, and technical variables that affect the management processes of space organizations are examined. Prerequisite: SPST 560 or SPST 541. On demand.

SPST 565. Space Law. 3 Credits.
This course serves as a graduate-level introduction to the field of Law as applied to Space Law. The course examines the origins and evolution of the laws of outer space from the beginnings of the space age to the present. International laws governing access and use of space, and national laws regulating governmental and commercial activities in space are reviewed and analyzed. On demand.

SPST 570. Advanced Topics in Space Studies. 1-3 Credits.
Lecture, discussion and readings on advanced topics of current interest. May be repeated if the topic is different. Repeatable.

SPST 574. Remote Sensing in Developing Countries. 3 Credits.
This course will introduce students to remote sensing programs in developing countries and typical remote sensing application areas pertinent to developing countries, such as: potable water, forest fires, vector diseases, environmental degradation, food security, fisheries, floods, droughts, crop pests, etc., with case studies. Prerequisite: SPST 522 or GEOG 475 or consent of instructor. On demand.

SPST 575. Remote Sensing Law and Policy. 3 Credits.
This course focuses on the evolving laws, policies, and institutions that have long-term ramifications for earth observations. Some topics addressed are the United Nations Principles on Remote Sensing, the U.S. Land Remote Sensing Policy Act of 1992, the commercialization of remote sensing activities, as well as manned and unmanned aerial remote sensing systems and their intersection with criminal and civil law. The course will also analyze current and developing remote sensing law, regulations, and technological capabilities, and their implications for both legal and cultural conceptualizations of privacy. At the U.S. domestic level, this will involve 4th Amendment jurisprudence, privacy laws, and case law. On demand.

SPST 581. Field Visit to Space Centers. 1-3 Credits.
This course will provide a first-hand knowledge of selected space centers in the U.S. and/or abroad through an organized field visit. The field visit will be led by a space studies faculty and will include prior preparation through readings, class seminars, lectures and written assignments. May be repeated up to a maximum of 3 credits. Repeatable to 3 credits. S/U grading. On demand.

SPST 590. Space Studies Colloquium. 1 Credit.
A series of lectures presented by visiting lecturers and faculty. May be repeated for up to 2 credits. S/U grading.

SPST 591. Readings in Space Studies. 1-3 Credits.
Readings in selected Space Studies topics, with written and/or oral reports. Repeatable to a maximum of 6 credits. Prerequisite: Consent of instructor. Repeatable to 6 credits.

SPST 593. Individual Research in Space Studies. 1-3 Credits.
Individual student projects designed to develop advanced knowledge in a specific area of expertise. A written report is required. May be repeated for up to 6 credits for Master’s and up to 12 credits for Ph.D. Repeatable to 6 credits.

SPST 595. Space Studies Capstone. 3 Credits.
The capstone course integrates, extends and applies knowledge gained in earlier Space Studies courses and reading. The major component of this course is a collaborative team project inter-relating policy, technology and science. This course is required for students who select the non-thesis option and can be taken after completing at least 25 credits in the program or completion of the curriculum breadth requirements. The course concludes with a required week-long capstone experience on the UND campus in the spring. Prerequisites: SPST 501, SPST 502, SPST 997, Comprehensive Exam, Graduate school status, and a GPA of 3.0 or higher. Prerequisite or Corequisite: Will graduate in the calendar year; either in Spring, Summer, or Fall semesters. F.

SPST 996. Continuing Enrollment. 1-12 Credits.
Prerequisite: Department consent. Repeatable. S/U grading.

SPST 997. Independent Study Report. 2 Credits.
Independent study and preparation of a written report for students taking the non-thesis option in the Master’s program.

SPST 998. Thesis. 1-6 Credits.
An original research project approved by and completed under the supervision of a thesis committee. Prerequisites: Graduate standing in Space Studies and completion and approval of a thesis proposal (see department for approval). Repeatable to 6 credits.

SPST 999. Dissertation. 1-12 Credits.
An original research project approved by and completed under the supervision of a dissertation committee. Prerequisites: Graduate standing, approval, completion, and defense of dissertation proposal. Repeatable to 18 credits. F,S,SS.

Undergraduate Courses for Graduate Credit

SPST 405. Space Mission Design. 3 Credits.
A team design project to develop the requirements for a space mission. The specific mission will vary from time to time. Design teams will work on selected portions of the mission. Accompanying lectures will provide background material. Prerequisite: SPST 200. S.

SPST 410. Life Support Systems. 3 Credits.
A review of the physiological effects of living in space including a discussion of current and near-term life support systems equipment for the provision of oxygen, water, food, and radiation protection. In addition, a review will be made of the issues associated with the development of fully closed ecological life-support systems that will be essential to the long-term development of space. Prerequisite: SPST 200. On demand.

SPST 425. Observational Astronomy. 3 Credits.
This course explores aspects of observational astronomy including monochromatic imaging, astrometry, and photometry. Basic observing techniques, astronomical equipment, characteristics of the night sky, data reduction, interpretations, as well as image processing techniques will be taught. Students will learn to operate a remotely controllable Internet telescope and CCD camera. A broadband Internet connection is required. Night observing is required. Prerequisite: PHYS 110. S.

SPST 450. International Space Programs. 3 Credits.
This course introduces students to the major governmental space programs around the world. The history, activities and future directions of the Russian/Soviet, European/ESA, Chinese, Japanese, Indian and other space programs will be explored. International collaborations between the various programs will also be studied. Prerequisite: SPST 200. On demand.

SPST 460. Life in the Universe. 3 Credits.
This course examines the nature and evolution of life on Earth from its origin to the present time in the context of cosmological evolution, chemical evolution, planetary evolution, biological evolution, and cultural evolution. The possibility of life elsewhere in the universe is considered based on the conditions under which life could arise and flourish. Human changes to the Earth are placed within this context. The future of life on Earth is discussed and the social and cultural implications arising from the discovery of extraterrestrial life are explored. On demand.

Master of Science in Aviation

Admission Requirements

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. Bachelor’s degree in Aviation/Aeronautics or Bachelor’s degree from an accredited institution—minimum of 20 semester credits of appropriate aviation related undergraduate work.
2. Graduate Record Examination, General Test.
3. Overall undergraduate GPA of 2.75 or a GPA of at least 3.00 for the last two years of undergraduate work.
4. Aviation industry experience, which can include any Federal Aviation Administration (FAA) certificates (pilot, mechanic, air traffic, dispatch, ground, etc.) or applied aviation industry knowledge.
5. Students must submit a 2-3 page paper answering specific questions per deparmental guidelines. One of the questions will address the potential thesis or independent study topic. Students that do not possess an FAA certificate must submit a 2-3 page paper/resume outlining their aviation industry experience.

6. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

**Degree Requirements**

1. A minimum of 30 credits including a 4-credit thesis. In the event a thesis is unable to be completed, an independent study option is available by special permission by the Graduate Director. In that case, a minimum of 32 credit hours which includes comprehensive exams and a 2-credit independent study.

2. If the independent study option is approved, comprehensive exams are required prior to beginning the independent study.

3. Required courses include AVIT 501, AVIT 503 Statistics, 504 Research Methods, AVIT 998 Thesis or AVIT 997 with special permission, and AVIT 595 Capstone.

4. In addition to the required courses, students will select elective courses from the Course Catalog.

5. Follow the Graduate Catalog and Graduate Student Handbook, Master’s Degree for completion of:
   a. Program of Study
   b. Advisor Selection
   c. Independent Study/Thesis Option
   d. Topic Proposal

6. AVIT 590 Aviation Seminar and AVIT 593 Individual Research in Aviation can be taken with permission from a sponsoring faculty member.

7. Must have an overall Grade Point Average (GPA) of 3.0

**Aviation Safety Specialization**

The Master of Science program offers an area of specialization in Aviation Safety. In order to receive this specialization:

1. Be fully admitted to the UND School of Graduate Studies and be in good academic standing in the MS-Aviation program;

2. Successfully complete 9 credits of AVIT coursework in the area of Aviation Safety from the course list below. AVIT 590 (Aviation Seminar) courses relevant to Aviation Safety and other relevant UND Graduate Courses may be approved to count towards the Aviation Safety Specialization with permission from the Graduate Director.

3. Course List
   a. AVIT 514 Aviation Management Theory (3)
   b. AVIT 502 Aviation Economics (3)
   c. AVIT 520 Strategic Airport Planning (3)
   d. AVIT 524 Air Traffic Management (3)

**Human Factors Specialization**

The Master of Science program offers an area of specialization in Human Factors. In order to receive this specialization:

1. Be fully admitted to the UND School of Graduate Studies and be in good academic standing in the MS-Aviation program;

2. Successfully complete 9 credits of AVIT coursework in the area of Human Factors from the course list below. AVIT 590 (Aviation Seminar) courses relevant to Human Factors and other relevant UND Graduate Courses may be approved to count towards the Human Factors Specialization with permission from the Graduate Director.

3. Course List
   a. AVIT 515 Human Factors and Ergonomics (3)
   b. AVIT 516 Training System Design (3)
   c. AVIT 518 Human Error (3)

**Domestic Air Law Specialization**

The Master of Science program offers an area of specialization in Domestic Air Law in collaboration with the UND School of Law. In order to receive this specialization:

1. Be fully admitted to the UND School of Graduate Studies and be in good academic standing in the MS-Aviation program;

2. Have completed AVIT 501 General Issues in Aviation/Aerospace and AVIT 503 Statistics and be in their second year of the MS-Avition program;

3. Receive permission from the Aviation Graduate Program Director;

4. Successfully complete 9 credits of coursework in the UND School of Law including:
   a. LAW 210 , and;
   b. 6 credits from the following:
      c. LAW 212  3
      LAW 214  3
      LAW 263  3
      LAW 282  2
      LAW 291  1-4
      LAW 299  2

**Note:** Law courses available on-campus only (not available via distance education).

**Doctor of Philosophy in Aerospace Sciences**

**Admission Requirements**

The applicant must meet The School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog. All elements must be complete by the published application date. The additional requirements for admission to the Aerospace Sciences Ph.D. program are as follows:

1. A Master’s or graduate degree from an accredited institution with a GPA of at least 3.25/4.0

2. Submission of a statement of personal goals
3. Professional resume
4. Satisfy the School of Graduate Studies English Language Proficiency requirements as published in the graduate catalog.
5. The Graduate Record Examination (GRE) General Exam
6. Industry experience preferred

**Financial Assistance**

Financial aid in the form of teaching, research or service assistantships and tuition waivers are available from a variety of internal and external sources and are awarded on a competitive basis. These appointments are renewable if students are making satisfactory progress toward the degree and their work is satisfactory. Applications for funding opportunities should coincide with the program application date.

**Degree Requirements**

- Ninety credits beyond a baccalaureate degree. With approval of the Aerospace Sciences Ph.D. Program and the UND School of Graduate Studies, up to thirty credits from a master’s degree from an accredited institution can be applied toward the requirements of the doctoral degree.
- Successful completion of sixty semester credits beyond the master’s degree
- Successful completion of qualifying exam prior to advancement to candidacy
- Twelve to eighteen semester credits of dissertation (AVIT 999 Dissertation or SPST 999 Dissertation) and successful defense of the dissertation
- Required core courses AVIT 501 General Issues in Aviation/Aerospace, SPST 501 Survey of Space Studies I, AVIT 521 Ethics in Aerospace and AVIT 590 Aviation Seminar/SPST 590 Space Studies Colloquium
- Six to twelve semester credits of Scholarly Tools beyond the Master’s degree requirements
- Remaining coursework from Aviation/Space Studies or other UND approved Graduate Courses
- The student and committee must all be present for oral comprehensive exams, formal topic proposal, and dissertation defense, either by physical presence or at a distance using real-time synchronous technology, as determined by the student and advisor or committee.

There are four required core courses, in addition to the Scholarly Tools component. These courses may have been part of the student’s MS program and cannot be counted twice.

1. AVIT 501 General Issues in Aviation/Aerospace
2. SPST 501 Survey of Space Studies I
3. AVIT 521 Ethics in Aerospace
4. AVIT 590 Aviation Seminar/SPST 590 Space Studies Colloquium: (EITHER 2 credits of SPST 590 OR 1 credit of SPST 590 plus 1-3 credits of AVIT 590)

The Scholarly Tools requirement is 6 to 12 semester credits, to be determined by the student’s advisor and/or committee, from the courses listed below. These courses are in addition to what may transfer as part of the student’s Master’s degree program. Therefore, a minimum of six credits will be required as part of the Ph.D. program.

- AVIT 503 Statistics (or equivalent)
- AVIT 504 Research Methods
- SPST 504 Research Methods in Space Studies
- AVIT 505 Qualitative Research Methods
- AVIT 506 Quantitative Research Methods
- AVIT 507 Advanced Research Methods

**Course Designations (SPST)**

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<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>SPST 450</td>
<td>International Space Programs</td>
<td>3</td>
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<tr>
<td>SPST 540</td>
<td>Space Economics and Commerce</td>
<td>3</td>
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<tr>
<td>SPST 541</td>
<td>Management of Space Enterprises</td>
<td>3</td>
</tr>
<tr>
<td>SPST 545</td>
<td>Space and the Environment</td>
<td>3</td>
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<tr>
<td>SPST 551</td>
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<td>SPST 552</td>
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<td>3</td>
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<tr>
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<td>Space Law</td>
<td>3</td>
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<td>SPST 574</td>
<td>Remote Sensing in Developing Countries</td>
<td>3</td>
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<tr>
<td>SPST 575</td>
<td>Remote Sensing Law and Policy</td>
<td>3</td>
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<tr>
<td>SPST 581</td>
<td>Field Visit to Space Centers</td>
<td>1-3</td>
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</tbody>
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Technical area courses:
- SPST 405 | Space Mission Design | 3 |
- SPST 410 | Life Support Systems | 3 |
- SPST 425 | Observational Astronomy | 3 |
- SPST 430 | Earth System Science | 3 |
- SPST 435 | Global Change | 3 |
- SPST 460 | Life in the Universe | 3 |
- SPST 500 | Introduction to Orbital Mechanics | 3 |
- SPST 505 | Spacecraft Systems Engineering | 3 |
- SPST 506 | Advanced Orbital Mechanics | 3 |
- SPST 512 | Human Performance in Extreme Environments | 3 |
- SPST 515 | Human Factors in Space | 3 |
- SPST 519 | Closed Ecological Systems for Life Support | 3 |
- SPST 520 | Asteroids, Meteorites and Comets | 3 |
- SPST 521 | The Planet Mars | 3 |
- SPST 522 | Remote Sensing Principles | 3 |
- SPST 523 | Remote Sensing Applications | 3 |
- SPST 524 | Current Topics in Astrobiology | 3 |
- SPST 525 | Technical Issues in Space | 1-3 |
- SPST 526 | Advanced Observational Astronomy | 3 |
- SPST 527 | Extraterrestrial Resources | 3 |
- SPST 528 | Space Environment and the Sun | 3 |
- SPST 570 | Advanced Topics in Space Studies (may count towards either social or technical area depending on the contents.) | 1-3 |

**Biology**

M.S. in Biology (p. 342)
Ph.D. in Biology (p. 342)

**Courses**

**BIOL 503. Seminar. 1 Credit.**
Discussion of selected topics in advanced biology, a different topic each semester. Repeatable to 6 credits.

**BIOL 505A. Biological Inquiry for Teachers. 3 Credits.**
First of general biology course sequence intended for teachers planning to qualify to teach high school biology, or teachers looking to enrich their content knowledge in biology for professional development. Topics will include energy conversion, cell and molecular biology, genetics, physiology, evolution, ecology, and pedagogical issues. May not be used in Ph.D. or Master’s programs. Prerequisite: BIOL 505L On demand.

**BIOL 505B. Biological Inquiry for Teachers. 3 Credits.**
First of general biology course sequence intended for teachers planning to qualify to teach high school biology, or teachers looking to enrich their content knowledge in biology for professional development. Topics will include energy conversion, cell and molecular biology, genetics, physiology, evolution, ecology, and pedagogical issues. May not be used in Ph.D. or Master’s programs. Prerequisite: BIOL 505A.

**BIOL 505L. Biological Inquiry for Teachers Laboratory. 2 Credits.**
This hands-on lab course complements Biol 505 and is intended for teachers planning to enrich their practical skills in biology for professional development. May not be used in Ph.D. or Master’s programs. Prerequisite: Must be licensed k-12 teacher.
BIOL 506A. Ecology for Teachers. 3 Credits.
Second of a general biology course sequence intended for teachers planning to qualify to teach high school biology, or teachers looking to enrich their content knowledge in biology for professional development. Topics will include physiological ecology, behavioral ecology, population ecology, community ecology, landscape ecology, geographical ecology, global ecology and pedagogical issues. May not be used in Ph.D. or Master's programs. Prerequisite: BIOL 506L.

BIOL 506B. Ecology for Teachers. 3 Credits.
Second of a general biology course sequence intended for teachers planning to qualify to teach high school biology, or teachers looking to enrich their content knowledge in biology for professional development. Topics will include physiological ecology, behavioral ecology, population ecology, community ecology, landscape ecology, geographical ecology, global ecology and pedagogical issues. May not be used in Ph.D. or Master's programs. Prerequisite: BIOL 506A.

BIOL 506L. Ecology for Teachers Laboratory. 2 Credits.
This hands-on lab course complements Biol 506 and is intended for teachers planning to enrich their practical skills in biology for professional development. May not be used in Ph.D. or Master's programs. Prerequisites: BIOL 505L and BIOL 505B.

BIOL 507A. Cellular and Molecular Biology for Teachers. 3 Credits.
Third of a general biology course sequence intended for teachers planning to qualify to teach high school biology, or teachers looking to enrich their content knowledge in biology for professional development. Topics will include cell, molecular, developmental and evolutionary biology. May not be used in Ph.D. or Master's programs. Prerequisite: BIOL 507L.

BIOL 507B. Cellular and Molecular Biology for Teachers. 3 Credits.
Third of a general biology course sequence intended for teachers planning to qualify to teach high school biology, or teachers looking to enrich their content knowledge in biology for professional development. Topics will include cell, molecular, developmental and evolutionary biology. May not be used in Ph.D. or Master's programs. Prerequisite: BIOL 507A.

BIOL 507L. Cellular and Molecular Biology for Teachers Laboratory. 2 Credits.
This hand-on lab course complements Biol 507 and is intended for teachers planning to enrich their practical skills in biology for professional development. May not be used in Ph.D. or Master's programs. Prerequisite: Must be licensed K-12 teacher.

BIOL 509. Scientific Writing. 2 Credits.
Writing is an essential part of the scientific enterprise. In this course, students will develop their scientific writing skill through readings and discussion on the nature of effective writing, and through critique of writing projects produced by each student. Course can be repeated up to 4 credits for different writing projects. Prerequisite: Consent of instructor. Repeatable to 4 credits. F.

BIOL 512. Advanced Evolutionary Analysis. 2 Credits.
This course will focus on methods that reconstruct evolutionary histories of populations, species and higher-level taxa. The course will also discuss the evolution of specialized traits using appropriate analyses. Prerequisite: Consent of instructor. On demand.

BIOL 533. Grassland Ecology. 2 Credits.
Phytogeography, environmental influences, and community dynamics of grassland ecosystems with emphasis on herbage production, ecosystem modeling, and ecological characteristics of major grass species. Prerequisite: BIOL 332 or an equivalent approved by the department.

BIOL 534. Quantitative Ecology. 3 Credits.
An introduction to the methods employed in the study of the ecology of natural populations/communities of plants and animals.

BIOL 535. Physiological Ecology. 3 Credits.
Critical evaluation and synthesis of selected theoretical topics in physiological ecology. Prerequisite: BIOL 442 or consent of instructor. On demand.

BIOL 536. Advanced Population Biology. 3 Credits.
In this course we will examine current thinking on a range of topics in population ecology, population genetics and the links between ecological and evolutionary dynamics. Students will build on background reading by developing their own models of some aspect of population biology (ecological and/or genetic). Prerequisite: Consent of instructor. S, even years.

BIOL 571. Research Design and Statistical Analysis. 3 Credits.
Topics in scientific inference, research design, and current approaches to statistical analysis of data in biology and other studies of the natural world. Practical data analysis using commonly available software. Prerequisite: An introductory course in statistics. F.

BIOL 572. Design of Biological Experiments. 1 Credit.
Topics in designing biological experiments including the role of experimentation, inference, sampling, replication, controls, and power analysis. Corequisite: BIOL 470 or consent of instructor. F.

BIOL 590. Special Topics. 1-4 Credits.
Important and current topics in biology not covered by other courses. Repeatable when topics vary. Examples include: Aquaculture, Big Game Biology, Biorhythms, Conservation Biology, Fire Ecology, Molecular Techniques, Plant-Animal Interactions, Sex Determination and Speciation. Prerequisite: Graduate status or upper division status with consent of instructor. Repeatable.

BIOL 592. Directed Studies. 1-4 Credits.
Designed to meet the needs of individual and small groups of students in areas of faculty specialization. May be repeated to a total of 12 credits. Repeatable to 12 credits.

BIOL 593. Advanced Topics in Plant Biology. 1-4 Credits.
Advanced topics in plant biology. Examples include: Plant Development, Plant Biochemistry, and Plant Genetics. Repeatable when topics vary. Prerequisite: Graduate status or upper division status with consent of instructor. Repeatable. On demand.

BIOL 594. Advanced Topics in Genetics. 1-4 Credits.
Advanced topics in genetics. Examples include: Biochemical Genetics, Cytogenetics, and Human Medical and Population Genetics. Repeatable when topics vary. Prerequisite: Graduate status or upper division status with consent of instructor. Repeatable. On demand.

BIOL 595. Advanced Topics in Fisheries, Wildlife, and Conservation. 1-4 Credits.
Advanced topics in fisheries, wildlife or conservation biology. Examples include: Natural Resource Policy, Waterfowl Biology and Management, and Wetland and Prairie Ecology. Repeatable when topics vary. Prerequisite: Graduate status or upper division status with consent of instructor. Repeatable. On demand.

BIOL 596. Advanced Topics in Parasitology. 1-4 Credits.
Advanced topics in parasitology. Examples include: Arthropod Borne Diseases, Helminthology, Disease Biology, and Medically Important Arthropods. Repeatable when topics vary. Prerequisite: Graduate status or upper division status with consent of instructor. Repeatable. On demand.

BIOL 597. Advanced Topics in Physiology and Development. 1-4 Credits.
Advanced topics in physiology and development. Examples include: Comparative Endocrinology, Vascular Development, Embryonic Physiology, and Neural Physiology. Repeatable when topics vary. Prerequisite: Graduate status or upper division status with consent of instructor. Repeatable. On demand.

BIOL 599. Research. 1-15 Credits.
Intended for students conducting original research in consultation with staff. Repeatable. S/U grading.

BIOL 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

BIOL 997. Independent Study. 2 Credits.

BIOL 998. Thesis. 1-9 Credits.
Repeatable to 9 credits.

BIOL 999. Dissertation. 1-15 Credits.
Repeatable to 15 credits.

Undergraduate Courses for Graduate Credit

BIOL 312. Evolution. 3 Credits.
A study of the processes that have led from the origin of life to the diverse patterns and forms of life observable today. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L or an equivalent approved by the department. S.
BIOL 315. Genetics. 3 Credits.
An introduction to genetics, with emphasis on classical genetic analysis and the biochemistry of gene transmission, expression and regulation. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L or an equivalent approved by the department. F.

BIOL 332. General Ecology. 3 Credits.
An introduction to ecology. Covers the relationship of individuals, populations, communities and ecosystems to their biotic and abiotic environments. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L or an equivalent approved by the department. F.

BIOL 332L. Gen Ecology Lab. 1 Credit.
Field projects and laboratory exercises to complement BIOL 332. Counts as an upper-division laboratory course. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L. Prerequisite or Corequisite: BIOL 332. F.

BIOL 333. Population Biology. 3 Credits.
Principles of population genetics, population ecology, and evolution in plants and animals. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, BIOL 151L, and MATH 93 or higher. S.

BIOL 336. Systematic Botany. 4 Credits.
Morphology, evolution, and classification of vascular plants with emphasis on the flora of the Great Plains. Counts as an upper-division laboratory course. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L or permission of instructor. F, even years.

BIOL 338. Animal Behavior. 2 Credits.
Studies in animal social behavior. The influences of environmental factors on behavior is emphasized. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, BIOL 151L or an equivalent approved by the department. S, even years.

BIOL 341. Cell Biology. 3 Credits.
Description of processes common to life at the cellular level including: biochemical and structural organization, membrane function, motility, signal transduction, growth, division and genetic regulation of the cell. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, BIOL 151L. Prerequisite or Corequisite: BIOL 341, CHEM 122. S.

BIOL 341L. Cell Biol Lab. 1 Credit.
Laboratory investigation utilizing techniques to study life at the cellular level including chemical composition and characterization, enzyme kinetics, metabolism and microscopy. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, BIOL 151L. Prerequisites or Corequisites: BIOL 341, CHEM 122. S.

BIOL 350. Plant Ecology. 3 Credits.
Structure and function of plants as they relate to the maintenance of plant populations and communities. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L or permission of instructor. S, even years.

BIOL 363. Entomology. 4 Credits.
Structure, functions, life history, classification, habits and distribution of insects. Counts as an upper-division laboratory course. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L or an equivalent approved by the department. F, even years.

BIOL 364. Parasitology. 2 Credits.
Classification, structure, functions, and life-cycles of parasites having importance to human, wildlife and veterinary health. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L. F, odd years.

BIOL 364L. Parasitology Laboratory. 2 Credits.
A basic parasitology laboratory to complement BIOL 364. Counts as an upper-division laboratory course. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L. Prerequisite or Corequisite: BIOL 364. F, odd years.

BIOL 369. Histology. 2 Credits.
Microscopical anatomy of vertebrate tissues and organs, with emphasis on man and other mammals. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L or an equivalent approved by the department. S.

BIOL 369L. Histology Lab. 2 Credits.
A basic histology laboratory to complement BIOL 369. Counts as an upper-division laboratory course. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L or an equivalent approved by the department. Prerequisite or Corequisite: BIOL 369. S.

BIOL 376. Animal Biology. 3 Credits.
Evolution, morpho-anatomy, development, reproduction and other aspects of the natural history of invertebrate and vertebrate animals. Prerequisites: BIOL 150 and BIOL 151. S.

BIOL 378. Developmental Biology. 3 Credits.
An overview of general stages and mechanisms of development, experimental approaches used to study developmental processes, and genetic and environmental influences that govern development. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, BIOL 151L, BIOL 315 and BIOL 341. F.

BIOL 410. Molecular Biology Techniques. 4 Credits.
Applications of DNA and RNA analysis and recombinant DNA technologies, emphasizing practical experience in the laboratory. This class will meet twice a week for 50 minutes in the classroom, and students will be expected to work approximately 4-6 hours a week in the lab during open lab times. Counts as an upper-division laboratory course. Prerequisite: BIOL 315 is recommended. F, S.

BIOL 415. Genomics. 4 Credits.
Genetics describes the determination of the complete nucleotide sequence of an organism and subsequent analyses to decode the structural and functional information of all genes and regulatory sequences in the genome. This four-credit course will consist of lectures, computer lab sessions, in-class exercises, take-home assignments, student presentations, and discussion of research articles. Counts as an upper-division laboratory course. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, BIOL 151L or an equivalent approved by the department. F, even years.

BIOL 425. Ichthyology. 3 Credits.
Structure and function, anatomy, physiology, behavior, classification, distribution and ecologic aspects of fishes. Counts as an upper-division laboratory course. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L or an equivalent approved by the department. F.

BIOL 426. Birds & Mammals. 4 Credits.
Birds and Mammals is designed to familiarize students with avian and mammalian biology, including anatomy and physiology, behavior, ecology, evolution and conservation. Lab exercises will be integrated with lecture to emphasize taxonomy and identification. Counts as an upper-division laboratory course. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L. S.

BIOL 430. Human Dimensions of Wildlife and Fisheries. 3 Credits.
This course explores interactions among humans and fisheries and wildlife resources, with a focus on principles important for understanding and addressing wildlife management. Topics will include public attitudes, expectations and diverse values of fisheries and wildlife resources; stakeholder engagement; public relations; governance; philosophy and ethics of resource use and management; and human dimensions research methodology. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L. S.

BIOL 431. Wildlife Management. 4 Credits.
Theory and methods of management of wildlife populations. Counts as an upper-division laboratory course. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L or an equivalent approved by the department. F, odd years.

BIOL 432. Techniques in Wildlife Population Assessment. 4 Credits.
Techniques in Wildlife Population Assessment is a course designed to teach wildlife biology students the techniques used to assess wildlife populations for conservation and management. Students learn the appropriate situations to use the techniques, how to properly conduct the procedures, how to collect data from the use of these techniques, and how to report the findings to a variety of audiences. The structure of the course is designed to teach students proper research methodology so that they not only know how and when to use the techniques, but also how they can apply their findings to make appropriate management recommendations for wildlife conservation and management under a variety of settings or conditions. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L or an equivalent approved by the department. S.

BIOL 433. Aquatic Ecology. 3 Credits.
Analysis of the relationships between organisms and their physical, chemical and biological environments in freshwater ecosystems. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L or an equivalent approved by the department. S. odd years.

BIOL 435. Large Mammal Ecology and Management. 3 Credits.
A course covering details of the population ecology, specialized management approaches and techniques, and conservation of large-bodied mammals in North America and worldwide. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L or an equivalent approved by the department. S. odd years.

BIOL 438. Fisheries Management. 3 Credits.
Concepts and approaches to the management of freshwater fisheries. Course will include discussion of life histories and requirements of important regional sport fishes. Counts as an upper-division laboratory course. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L or instructor permission. S, even years.
Doctor of Philosophy in Biology

Admission Requirements

1. Must meet current minimum general requirements as published by the School of Graduate Studies.
2. May enter the program with a Master’s degree or directly with a Bachelor’s degree.
3. All applicants seeking admission to the biology graduate program must provide GRE General test scores. Strength of scores will be considered regarding admission and awarding of departmental support.
4. Minimum GPA of 3.0 for the Master’s degree work. If applying with only an undergraduate degree, must have a minimum GPA of 2.75 for all undergraduate work or 3.0 for junior - senior credits.
5. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog

Financial Assistance

Financial aid in the form of teaching assistantships, research assistantships, fellowships and internships are available on a competitive basis. Students seeking teaching assistantships should complete their applications by February 15, since most offers for appointments are made beginning in early March. Teaching assistantships are renewable if progress toward the degree and instructional service are satisfactory. Research assistantships may be offered by faculty members for work on specific research projects for nine or twelve month periods.

Degree Requirements

Students seeking the Doctor of Philosophy degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Biology Department.

The Ph.D. degree program requires the completion of a program of study of at least 90 semester credits beyond the baccalaureate degree. The program of study, prepared with the approval of a five-member faculty advisory committee, includes the following:

1. A major area of a minimum 90 credits including coursework, research and dissertation structured at the committee’s discretion but with a minimum of 18 semester credits of course work. Work completed in a master’s program may be incorporated into the doctoral program if approved by the student’s advisory committee.

2. A minor is not required, but each student is expected to show competence in related areas as determined by the student’s faculty advisory committee.
3. A minimum of 5 credits on BIOL 503 Seminar (included in 1. above).
4. A minimum of four (4) credits on BIOL 509 Scientific Writing (credits included in 1. above). Two credits should be taken while the student is writing their thesis proposal (see below). Two credits can be waived at the discretion of the student’s advisory committee for students with a well-written Master’s thesis and at least one first-authored publication in press.
5. BIOL 470 Biometry (3 credits) or another introductory statistics course and either 1) BIOL 571 Research Design and Statistical Analysis (3 credits), 2) a 500-level, data analysis course (3 credits minimum) in a specialty area approved by the student’s advisory committee, or 3) prior equivalent graduate course in statistical analysis and experimental design if approved by the student’s advisory committee.
6. Two scholarly tools. The nature of the scholarly tools shall be determined based upon their importance to the student’s field of research as determined by the student’s advisory committee.
7. Satisfactory completion of an acceptable dissertation proposal (written proposal, proposal presentation and proposal defense) evaluated by the student’s advisory committee.
8. Satisfactory completion of a comprehensive examination administered by the student’s advisory committee.

Master of Science in Biology

Admission Requirements

1. Must meet current minimum general requirements as published by the School of Graduate Studies.
2. Must provide GRE General test scores. Strength of scores will be considered regarding admission and awarding of departmental support.
3. Minimum GPA of at least 2.75 for all undergraduate work or 3.0 for the junior - senior credits.
4. Students must indicate thesis vs. non-thesis option upon application. M.S. (thesis) students may request to by-pass the recommendation of their advisory committee.
5. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog

Students admitted to the M.S. program may, after one calendar year, and upon the recommendation of his/her advisory committee, request to by-pass the masters degree and work directly toward the Ph.D. degree. The same GRE and GPA requirements apply for by-pass as for students applying for the doctoral program through normal application procedures, i.e., a GPA no lower than 3.0 for work completed while in the M.S. program. The recommendation of the advisory committee shall be brought to a vote in a faculty meeting. A minimum of one week before such a meeting, the faculty shall be notified that the student’s updated file consisting of the materials used for application to the M.S. program, a transcript of all academic work completed at UND, and any additional materials the student wishes to have considered is available for review.

Students seeking summer or fall admission should complete their applications by February 15. Students seeking spring admission should check the School of Graduate Studies webpage for application deadline information. Master’s degree applicants should specify interest in either the thesis or non-thesis option. Inquiries should be directed to the Director of Graduate Studies, Biology Department.

Degree Requirements

Students seeking the Master of Science degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Biology Department. The Master of Science degree program is designed to produce broadly trained biologists for job opportunities or continued graduate study.
**Thesis Option**

The M.S. degree program with thesis requires the completion of a program of study of at least 30 semester credits beyond the baccalaureate degree. The program of study, prepared with the approval of a three-member faculty advisor committee, includes the following:

1. A minimum of 30 credits including coursework, research and thesis with research and thesis accounting for no more than 50% of credits.
2. A minimum of three (3) credits of BIOL 503 Seminar (credits included in 1. above).
3. A minimum of four (4) credits of BIOL 509 Scientific Writing, (credits included in 1. above). Two credits should be taken while the student is writing their thesis proposal (see below).
4. BIOL 470 Biometry (3 credits) or other introductory statistics course and either 1) BIOL 571 Research Design and Statistical Analysis (3 credits), 2) a 500-level, data analysis course (3 credits minimum) in a specialty area approved by the student's advisory committee, or 3) prior equivalent graduate course in statistical analysis and experimental design if approved by the student's advisory committee.
5. Satisfactory completion of an acceptable thesis proposal (written proposal, proposal presentation and proposal defense) evaluated by the student's advisory committee.
6. Satisfactory completion of a comprehensive examination administered by the student's advisory committee; and

**Non-Thesis Option**

This degree program is designed for students who wish to obtain broad training in graduate biology without research emphasis. The M.S. non-thesis degree program requires the completion of a program of study of at least 32 semester credits beyond the baccalaureate degree. The program of study prepared with the approval of a faculty supervisor, includes the following:

1. At minimum of 32 credits of coursework.
2. A minimum of three (3) credits of BIOL 503 Seminar (credits includes in 1. above).
3. A minimum of 23 credits in the major (credits included in 1. above).
4. BIOL 599 Research and BIOL 998 Thesis credits will not count toward the 32 credits.
5. Satisfactory completion of a comprehensive examination administered by the student’s advisor and two other faculty members selected by the student with the concurrence of the advisor, the faculty members involved and the department chairperson.
6. Satisfactory completion of an acceptable Independent Study. The Independent Study should be substantial and rigorous and involve a written report and a formal oral presentation to the Department.

**Biomedical Sciences**

M.S. in Biomedical Sciences (p. 347)

Ph.D. in Biomedical Sciences (p. 346)

**ANAT Courses**

ANAT 501. Biomedical Information Retrieval. 1 Credit.

This course integrates electron information retrieval techniques with biomedical research education to develop the student’s ability to augment traditional learning and research. Electronic techniques covered include data base searching and internet resources. S/U grading. F.S.SS.

ANAT 505. Seminar in Anatomy and Cell Biology. 1 Credit.

This course provides students an opportunity to organize and orally present scientific information to an audience in a forum conducive to the development of their skills in effective communication. Seminars delivered by students, UND faculty, and other invited speakers present current advancements in biomedical research that promote student learning of principles of biomedical sciences. Repeatable to 5 credits.

ANAT 513. Gross Anatomy. 6 Credits.

Gross Anatomy will be an intensive one semester course that will use a regional approach to enhance the understanding of the structural and functional relationships as well as organization of the adult human body. Lectures will be reinforced with complete cadaver dissection and multiple clinical imaging modalities to strengthen problem solving and critical thinking skills. Prerequisites: ANAT 204L and permission of the instructor. S.

ANAT 521. Principles of Developmental Biology. 3 Credits.

This is a student driven course designed to provide the student with a firm understanding of the concepts in developmental biology. Students will be using a wide range of materials from textbooks to the internet to gain a graduate level understanding including how to apply this knowledge to research applications. Student presentations will address advanced principles of developmental mechanisms and underlying human embryology. S.

ANAT 590. Readings in Anatomy and Cell Biology. 1-3 Credits.

Students may elect to do a readings.

ANAT 591. Special Topics in Anatomy and Cell Biology. 1-3 Credits.

A series of lectures, discussions and/or laboratory experiences developed around a specific topic in the anatomical or cell biological sciences. Prerequisite: Permission of instructor. Repeatable to 3 credits.

ANAT 593. Research in Anatomy and Cell Biology. 1-15 Credits.

Research is offered in the specialty fields of the faculty of the department, and involves a variety of problems and research tools in morphology and cell biology. Repeatable.

ANAT 996. Continuing Enrollment. 1-12 Credits.

Repeatable. S/U grading.

ANAT 997. Independent Study. 2 Credits.

ANAT 998. Thesis. 1-9 Credits.

Repeatable to 9 credits.

ANAT 999. Dissertation. 1-15 Credits.

Repeatable to 15 credits.

**BIMD Courses**

BIMD 501. Scientific Discovery I. 6 Credits.

A problem based course in which students will address a set of biomedical research scenarios that have been designed so that students will acquire skills in critical thinking, finding, interpreting, and analyzing scientific literature, developing hypothesis-driven questions, proposing and designing experiments, and communicating scientific outcomes orally and in written format. F.

BIMD 502. Scientific Discovery II. 6 Credits.

A problem based course in which students will address a set of biomedical research scenarios that have been designed so that students will advance their skills in critical thinking, finding, interpreting, and analyzing scientific literature, developing hypothesis-driven questions, proposing and designing experiments, and communicating scientific outcomes orally and in written format. This course is a continuation and advancement of BIMD 501. Prerequisite: BIMD 501. S.

BIMD 510. Basic Biomedical Statistics. 2 Credits.

A series of lectures, demonstrations and exercises to provide students with the basic rationales for the use of statistics in the assessment of biomedical data and a selected set of the most common and useful statistical tests. Prerequisite: BIMD 500 or permission of course director. S.

BIMD 513. Seminars in Biomedical Science. 1 Credit.

A series of presentations on original research conducted by UND faculty members as well as extramural leaders in academic and industrial research in the biomedical sciences. Students will participate through assigned reading and writing exercises related to the presentations.
BIMD 514. Foundations of Bioinformatics. 3 Credits.

In this course, students will learn fundamental concepts and methods in bioinformatics, a field at the intersection of biology and computing. The course surveys a wide range of topics including bioinformatics web resources, computational sequence analysis, sequence homology searching and motif finding, transcriptome analysis, and network/pathway analysis. Students will also have opportunities to learn about available bioinformatics web-resources (e.g. UCSC Genome Browser, STRING/BioGRID interaction databases, and etc), next-generation sequencing analysis (focusing on RNA-Seq data) as well as relevant data-analysis tools (R and BioConductor, Ingenuity Pathway Analysis, DAVID, etc). The course will also familiarize students with the Linux environment and computational tools needed to manipulate and analyze large biological sequencing data sets. Students will need a familiarity with basic biomedical concepts and basic knowledge of computer usage. No programming skills are required. Students should bring their own wifi-enabled laptop to lectures to fully benefit from the hands-on components of each lecture. Prerequisite: Open to graduate and senior undergraduate students with permission of the instructor. F.

BIMD 516. Responsible Conduct of Research. 2 Credits.

A series of lectures and discussion sessions covering topics related to responsible conduct in research. Students will examine a variety of issues including introduction to ethical decision making, the experience of conflict, laboratory practices, data management, reporting of research, conflict of interest, and compliance. Examples and case studies will be drawn primarily from the biomedical sciences. F.

BIMD 517. Principles of Histology. 3 Credits.

Principles of Histology is a laboratory and discussion based course that builds on prior experience in cell biology and involves a strong self-study component through the use of virtual slides as well as lecture and laboratory orientation videos. By the end of the course the student will have demonstrated a significant knowledge base of tissue microanatomy sufficient for understanding and applying the principles to a wide range of research projects. The student will also have gained sufficient knowledge of histology to be capable of teaching this material to medical, professional, graduate, and undergraduate students. Prerequisite: PATH 500 or permission of instructor. S.

BIMD 518. Grant Writing. 2 Credits.

This is an advanced graduate grant writing and oral presentation course. The objectives of this course are to challenge students: (1) to critically evaluate their own research in an effort to clearly define the significance and innovation of their project; (2) to begin to develop novel ideas based on their research efforts that have the potential to significantly impact their field of study, and (3) to prepare students to present these ideas orally and in a manner that is both logical and convincing. Prerequisites: BIMD 501 and BIMD 502, or consent of instructor. F.

BIMD 520. Principles of Neuroanatomy. 2 Credits.

In this course students will learn the fundamental principles of neuroscience, particularly gross and cellular anatomy, development and systems physiology of the nervous system. Behavioral, cognitive and clinical manifestations of abnormal neural functions will also be addressed. Prerequisite: BIMD 502 or permission of instructor. F.

BIMD 521. Neurophysiology. 2 Credits.

This course is designed to introduce students to the electrical properties of neuronal membranes. The course is organized to first provide a brief review of the basic properties of semi-permeable membranes. The electrical and biochemistry principles that apply to neuronal membranes are discussed. Prerequisite: BIMD 502 or consent of instructor. F.

BIMD 522. Principles of Neuropharmacology. 2 Credits.

This course is designed to introduce students to the latest developments in molecular neuropharmacology. The course directive is to provide an up-to-date foundation for clinical neuroscience by emphasizing a comprehensive molecular and cellular approach to the effects of drugs on the nervous system. Prerequisite: BIMD 502 or consent of instructor. S.

BIMD 523. Neurochemical Basis of the Nervous System. 2 Credits.

This course is designed to introduce students to fundamental concepts of brain metabolism and neurochemical signaling. It emphasizes recent advances in understanding brain biochemical processes and molecular mechanisms occurring in health and disease. Prerequisite: BIMD 502 or consent of instructor. S.

BIMD 524. Neurodegenerative Diseases and Pathophysiology. 2 Credits.

This course exposes students to diverse neurodegenerative diseases and nervous system pathophysiology. The emphasis is on mechanistic understanding of the most recent advances in the field. Prerequisite: BIMD 502 or consent of instructor. S.

BIMD 525. Readings in Neuroscience. 1-4 Credits.

A supervised readings course on topics of mutual interest to the student and a faculty member. Prerequisite: BIMD 502 or consent of instructor. Repeatable to 4 credits. On demand.

BIMD 526. Medical Experiences for Graduate Students. 1 Credit.

The goal of this course is to introduce the graduate student to a “disease-specific” clinical experience so that the student can acquire a better understanding of the importance of translational medicine, develop a firm appreciation of a patient's and a physician's understanding of disease and its treatment, and to introduce the student to the overall culture of clinical research. Prerequisites: Successful completion of comprehensive exam and permission of academic advisor and Instructor of Record; student should initiate discussion with the Instructor of Record at least one month prior to the start of enrollment. S/U grading. On demand.

BIMD 527. Advanced Studies in Biological Safety. 3 Credits.

This course is designed to provide fundamental concepts and methods in biological safety to典型的 biomedical, public health, and biology graduate students who do not have advanced training in microbiology, epidemiology, and environmental health sciences. Additionally, this course will fulfill some of the registration requirements for Registered Biosafety Professional (RBP) and Certified Biosafety Professional (CBSP) credential for individuals looking for careers in the field of biological safety. This course is open to graduate students and to senior undergraduate students with permission of the instructor. Prerequisite: Permission of the instructor.

BIMD 530. Components of the Immune System. 2 Credits.

Have you ever wondered why you don't get sick every time you breathe air which can carry as many as 2000 different kinds of microbes on any given day? Or what keeps your defense system from attacking your own cells but can get rid of most invaders without you even noticing? This is the amazing task of your fascinating immune system! This course will provide an overview of cellular and molecular components of mammalian immune system and their function. The students will learn how these components are derived and how they interact and communicate with each other to coordinate a response to pathological insults in order to protect the human body. Prerequisite: BIMD 502 or consent of instructor. F.

BIMD 531. Components of Microbial Pathogenesis. 2 Credits.

The objective of the course is to provide students with a background in the mechanisms of microbial pathogenesis. Students will learn basic principles of host-parasite interactions. Paradigms of host-parasite interactions will be illustrated by studying, at the molecular and cellular levels, specific infectious diseases and the agents that cause them. Prerequisite: BIMD 502 or consent of instructor. F.

BIMD 532. Microbial Gene Regulation. 1 Credit.

This course will provide an understanding of genetic regulation in bacteria. Classic pathways will be examined as paradigms of regulatory circuits. These examples will be expanded to learn how bacteria exploit host cells as well as the use of bacterial regulatory circuits in modern molecular biology. S.

BIMD 533. Microbial Membranes and Transport. 1 Credit.

This course will explore bacterial membranes with particular emphasis on generation of energy and transport of molecules across the membranes. Prerequisite: BIMD 502 or consent of instructor. S.

BIMD 534. Microbial Cell Structure and Function. 1 Credit.

Microbial cells have unique structures that relate their functions. Students completing this course will have an understanding of how prokaryotic and eukaryotic organisms differ and how different structures can be used to obtain similar functions. They will understand how microbial structures influence interactions between microbes and between microbes and eukaryotic organisms. Prerequisite: BIMD 502 or consent of instructor. S.

BIMD 535. Bacterial Host: Pathogen Interactions. 1 Credit.

The objective of the course is to provide students with a background in the fundamental aspects that occur at the bacterial: host interface. Students will learn the interplay between bacterial virulence factors, strategies used to evade host defenses, and host responses to infection. Prerequisite: BIMD 502 or consent of instructor. S.

BIMD 529. Advanced Topics in Bioinformatics. 3 Credits.

This course covers advanced topics in bioinformatics, focusing on the latest developments in the field. Prerequisite: BIMD 514 or consent of instructor.

BIMD 536. Advanced Topics in Neuroscience. 3 Credits.

This course covers advanced topics in neuroscience, focusing on the latest developments in the field. Prerequisite: BIMD 502 or consent of instructor.

BIMD 537. Advanced Topics in Microbiology. 3 Credits.

This course covers advanced topics in microbiology, focusing on the latest developments in the field. Prerequisite: BIMD 502 or consent of instructor.

BIMD 538. Advanced Topics in Medical Safety. 3 Credits.

This course covers advanced topics in medical safety, focusing on the latest developments in the field. Prerequisite: BIMD 502 or consent of instructor.

BIMD 539. Advanced Topics in Regenerative Medicine. 3 Credits.

This course covers advanced topics in regenerative medicine, focusing on the latest developments in the field. Prerequisite: BIMD 502 or consent of instructor.

BIMD 540. Advanced Topics in Quantitative Biology. 3 Credits.

This course covers advanced topics in quantitative biology, focusing on the latest developments in the field. Prerequisite: BIMD 502 or consent of instructor.

BIMD 541. Advanced Topics in Computational Biology. 3 Credits.

This course covers advanced topics in computational biology, focusing on the latest developments in the field. Prerequisite: BIMD 502 or consent of instructor.

BIMD 542. Advanced Topics in Neurodegenerative Diseases. 3 Credits.

This course covers advanced topics in neurodegenerative diseases, focusing on the latest developments in the field. Prerequisite: BIMD 502 or consent of instructor.

BIMD 543. Advanced Topics in Neuroanatomy. 3 Credits.

This course covers advanced topics in neuroanatomy, focusing on the latest developments in the field. Prerequisite: BIMD 502 or consent of instructor.

BIMD 544. Advanced Topics in Histology. 3 Credits.

This course covers advanced topics in histology, focusing on the latest developments in the field. Prerequisite: BIMD 502 or consent of instructor.

BIMD 545. Advanced Topics in Microbial Pathogenesis. 3 Credits.

This course covers advanced topics in microbial pathogenesis, focusing on the latest developments in the field. Prerequisite: BIMD 502 or consent of instructor.

BIMD 546. Advanced Topics in Gene Regulation. 3 Credits.

This course covers advanced topics in gene regulation, focusing on the latest developments in the field. Prerequisite: BIMD 502 or consent of instructor.

BIMD 547. Advanced Topics in Membrane Transport. 3 Credits.

This course covers advanced topics in membrane transport, focusing on the latest developments in the field. Prerequisite: BIMD 502 or consent of instructor.

BIMD 548. Advanced Topics in Biomedical Safety. 3 Credits.

This course covers advanced topics in biomedical safety, focusing on the latest developments in the field. Prerequisite: BIMD 502 or consent of instructor.
BIMD 536. Molecular Biology and Pathogenesis of Viruses. 1 Credit.
This course will cover the structure, replication, and pathogenesis of human RNA and DNA viruses, the host immune response to viral infection and the strategies employed by viruses to escape immune detection and elimination. Prerequisite: BIMD 502 or consent of instructor. S.

BIMD 537. Host-Pathogen Interactions involving Eukaryotic Microbes (Parasites/Fungi). 1 Credit.
Eukaryotic microbe infections have a devastating impact on global health and economic development as they infect over one third of the world's population and cause acute and chronic pathologies. Furthermore, macroscopic parasites (helminths/ worms) are master regulators of host inflammatory response and hence reduce the immune response to coinfections and negatively affect the success of vaccination programs against many other pathogens. In contrast, it has been proposed that the rise in autoimmune diseases in the developed world could be a direct result of the successful complete elimination of parasitic helminths in these communities. Thus, the purpose of this course is to provide a basic knowledge of the clinically important eukaryotic microbe pathogens and the immune response associated with their infections. A series of lectures will cover course components; a) basic introduction to protozoa, helminth, and fungi, and b) basic knowledge of the immune response and its involvement in parasitic/ fungal infections. An effort has been made to increase clinical relevance and problem-solving skills through a team-learning exercise involving quiz and paper presentations. S.

BIMD 538. Immunological Disorders. 1 Credit.
This course will include discussion of cellular and molecular immunopathologies leading to autoimmune diseases, and primary and secondary immunodeficiencies; and the role of the immune system in tumorigenesis and transplantation, as well as various methods of modification of the immune response. Prerequisite: BIMD 502 or consent of instructor. S.

BIMD 539. Readings in Microbiology and Immunology. 1-4 Credits.
A supervised readings course on topics of mutual interest to the student and a faculty member. Prerequisite: BIMD 502 or consent of instructor. Repeatable to 4 credits. On demand.

BIMD 590. Research. 1-12 Credits.
The course allows research in pertinent problems in various aspects of biomedical sciences. Repeatable. F,S,SS.

BIMD 591. Advanced Topics in Biomedical Sciences. 1-3 Credits.
A series of lectures, discussions and/or laboratory experiences developed around a specific topic in the biomedical sciences. Repeatable as topics vary. Prerequisite: BIMD 502 or consent of instructor. Repeatable to 6 credits. On demand.

BIMD 998. Thesis. 1-6 Credits.
Completion of thesis required for M.S. Repeatable to 6 credits. F,S,SS.

BIMD 999. Dissertation. 1-15 Credits.
Completion of dissertation required for Ph.D. Repeatable to 12 credits. F,S,SS.

BMB Courses

BMB 514. Current Literature. 1 Credit.
Students of the department rotate in leading informal reviews, analyses, and the discussions of research papers selected from current journals in the areas of biochemistry and molecular biology. Prerequisite: BIMD 500 or consent of instructor. S/U grading.

BMB 521. Seminar. 1 Credit.
Students present topics in biochemistry and molecular biology based on reviews of the current literature. Each presentation is followed by a discussion of the topic by the faculty and students of the department. Prerequisite: BIMD 500 or consent of instructor. S/U grading.

BMB 533. Advanced Topics. 1 Credit.
The purpose of this course is to provide an in-depth exploration of selected areas of protein structure and function, metabolism, regulation of cell functions, proteomics, recombinant DNA technology, eukaryotic nucleic acid metabolism, and gene expression with the intent of complementing and extending the knowledge base gained in BMB 500. Extensive independent learning is expected. Prerequisites: BIMD 500; alternatively, BMB 301 or equivalent and permission of instructor. Repeatable to 9 credits.

BMB 540. Special Topics. 1-3 Credits.
Discussion of a topic in biochemistry and/or molecular biology of current interest to faculty and students. Prerequisites: BIMD 500 or consent of instructor. Repeatable to 3 credits.

BMB 590. Research. 1-12 Credits.
The assignments deal with pertinent research problems in various aspects of biochemistry and molecular biology. Repeatable.

BMB 594. Special Problems in Biochemistry and Molecular Biology. 1-6 Credits.
The student in consultation with a faculty member of the department undertakes a laboratory research project. Prerequisite: Consent of instructor.

BMB 595. Readings in Biochemistry and Molecular Biology. 1-3 Credits.
Selected readings and library research in an area of mutual interest to the student and a faculty member of the department. Conferences and/or written reports are required. Prerequisites: BIMD 500 or consent of instructor.

BMB 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

BMB 998. Thesis. 1-9 Credits.
Repeatable to 9 credits.

BMB 999. Dissertation. 1-15 Credits.
Repeatable to 15 credits.

MBIO Courses

MBIO 507. Seminar in Microbiology. 1 Credit.
S/U grading. F.

MBIO 511. Microbiology and Immunology Literature. 1 Credit.
A series of reports of current scientific literature in Microbiology and Immunology. S/U grading. S.

MBIO 513. Research Tools. 2 Credits.
Orientation to research and laboratory safety. The theory and application of modern laboratory techniques include tissue culture, cell fractionation, enzyme assay, immunization procedures, bacterial growth curves, photomicrography, strain construction, genetic engineering, gel electrophoresis, enzyme immunoassay, and western blot techniques are presented. S/U grading. F.

MBIO 515. Advanced Topics. 2 Credits.
A series of topics in microbiology and immunology presented on an episodic basis. The topics may vary, but are expected to include: (A) Immunology, (B) Infectious Diseases, and (C) Molecular Biology. Prerequisite: Previous basic course in the area to be covered.

MBIO 590. Research in Microbiology. 2-6 Credits.
Advanced problems in microbiology and related fields. Hours arranged. Repeatable.

MBIO 591. Special Problems in Microbiology. 1-6 Credits.
Short-term research projects.

MBIO 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

MBIO 997. Independent Study. 2 Credits.

MBIO 998. Thesis. 1-8 Credits.
Repeatable to 8 credits.

MBIO 999. Dissertation. 1-15 Credits.
Repeatable to 15 credits.

PPT Courses

PPT 500. Principles of Physiology and Pharmacology. 6 Credits.
Graduate level survey course covering basic principles of human physiology and pharmacology. Material covered will include the physiology (how the body works) and the pharmacology (how drugs affect physiological functions) of the major organ systems. Covered also will be basic pharmacological principles including pharmacodynamics, pharmacokinetics and therapeutics. Teaching modalities used are designed to actively engage students in critical thinking and knowledge application. Prerequisite: BIMD 500 or consent of instructor.

PPT 503. Advanced Pharmacology or Physiology. 3 Credits.
Prerequisite: PPT 500 or consent of instructor.

PPT 505. Research Techniques. 1-3 Credits.
Prerequisite: Consent of instructor.

PPT 511. Biochemical and Molecular Mechanisms of Pharmacology. 3 Credits.
Fundamental concepts of pharmacology with emphasis on biochemical and molecular mechanisms. Prerequisites: BIMD 500 and PPT 500, or consent of instructor.
PPT 512. Special Topics in Pharmacology, Physiology and Therapeutics. 2 Credits.
An in-depth coverage of a particular topic chosen by the instructor.
Prerequisite: Consent of instructor.

PPT 521. Seminar in Pharmacology, Physiology and Therapeutics. 1 Credit.
S/U grading.

PPT 525. Advanced Renal Physiology. 3 Credits.
Prerequisite: PPT 500 or consent of instructor.

PPT 526. Advanced Respiratory Physiology. 3 Credits.
Prerequisite: PPT 500 or consent of instructor.

PPT 528. Advanced Endocrinology. 3 Credits.
Prerequisite: PPT 500 or consent of instructor.

PPT 529. Adv Cardiovascular Physiology. 3 Credits.
Prerequisite: PPT 500 or consent of instructor.

PPT 530. Advanced Neurochemistry. 3 Credits.
This course is designed to introduce graduate students to the discipline of neurochemistry. This course builds on concepts introduced in PPT 500, with an emphasis on brain biochemical processes occurring in health and disease.
Prerequisite: PPT 500 or consent of instructor.

PPT 590. Readings in PPT. 1-4 Credits.
Prerequisite: Consent of instructor. Repeatable to 8 credits.

PPT 591. Research in PPT. 1-15 Credits.
Repeatable.

PPT 996. Continuing Enrollment. 1-12 Credits.
Prerequisite: Consent of instructor. Repeatable. S/U grading.

PPT 998. Thesis. 1-9 Credits.
Prerequisite: Consent of instructor. Repeatable to 9 credits.

PPT 999. Dissertation. 1-12 Credits.
Prerequisite: Consent of instructor. Repeatable.

Joint M.D./Ph.D. in Biomedical Sciences

Through the cooperation of the School of Graduate Studies and the School of Medicine, students may concurrently pursue the Doctor of Philosophy degree in a medical science field (Anatomy and Cell Biology, Biochemistry and Molecular Biology, Microbiology and Immunology, Pharmacology, Physiology and Therapeutics) and the Doctor of Medicine degree. The minimum time required to complete the joint program is six years of full-time academic study.

Students interested in the joint M.D./Ph.D. program should first obtain admission to the School of Medicine and Health Sciences to the M.D. degree program, following the normal application process and meeting the selection criteria. A student admitted to the M.D. program may apply to School of Graduate Studies as soon as he/she has selected a graduate program, which may occur before matriculation in Medical School but not later than the end of the first year of Medical School.

Final admission requirements for the M.D./Ph.D. program include:

1. Satisfactory performance in the first two years of the medical education curriculum with passing scores on all required assessment tools.
2. Successful completion of the USMLE Step 1 examination.
3. Satisfactory scores achieved on General and Subject GRE examination or MCAT scores.
4. All other UND School of Graduate Studies admission requirements listed in the UND Academic Catalog.

If admission to a Ph.D. program is granted, the student should apply to the School of Medicine and Health Sciences Student Performance and Recognition Committee for a "modification of original program," which will allow the student to pursue the M.D. degree and Ph.D. degree concurrently. The student also must request the Office of Student Affairs to certify to the School of Graduate Studies his/her satisfactory completion of the first two years of the M.D. program.

Students are expected to complete the following general requirements for the Ph.D. degree in a medical science field:

1. Performance of original research of a quality suitable for publication in refereed, professional journals.
2. Pass final examination which includes preparation and oral defense of a satisfactory dissertation.
3. Completion of .
4. A minimum of 90 credit hours, including research and dissertation.
5. Successful completion of a scholarly tool (Note: May be specified by a department.)
6. Completion of the first two years of the medical education curriculum, transferred as 44 credits toward the Ph.D.

Doctor of Philosophy in Biomedical Sciences

Admission Requirements

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. Completion of a four-year Bachelor’s degree or equivalent from a recognized college or university as described in the UND Undergraduate and Graduate Academic Catalog. Exceptions must be approved by the Dean of the School of Graduate Studies.
2. Coursework: Admission into the Biomedical Sciences Graduate Program is dependent upon the applicant’s demonstration of effective academic skills and appropriate undergraduate training. Ideally, the applicant will have completed the following coursework:
   - General Biology with laboratory
   - General Chemistry with laboratory
   - Organic Chemistry with laboratory
   - Physics with laboratory
   - Biochemistry or equivalent
   - Calculus
   - Advanced undergraduate coursework in at least one of the following areas: molecular biology, celldevelopmental biology, genetics, neuroscience, biochemistry, microbiology, immunology, anatomy, or physiology.
3. Applicants must have a cumulative undergraduate GPA of at least 3.0/4.0. Applicants with previous graduate education should have a cumulative GPA of 3.5/4.0 in their graduate level course work.
4. Graduate Record Examination scores: Applicants must submit Graduate Record Examination scores. The General test is required; the Subject test is strongly recommended. The Biochemistry, Cell and Molecular Biology, Biology, or Chemistry subject tests are acceptable. Preference for admission will be given to applicants whose averaged test scores are at or above the 50th percentile.
5. International applicants must satisfy the School of Graduate Studies English Language Proficiency Requirements.
6. A Statement of Goals must be included with the application materials. This statement will describe the student’s academic achievements, research experience and accomplishments, career goals, and objectives for applying to the Biomedical Sciences Graduate Program.
7. Three letters of recommendation addressing the student’s academic performance and research or professional experience are required to complete the application. At least two letters must be from faculty having direct knowledge of the student's academic capabilities.
8. Preference will be given to students who can demonstrate undergraduate research and/or a record of scholarly publication or other relevant experience.
Degree Requirements

Students seeking the Ph.D. degree in the Biomedical Sciences Graduate Program must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Biomedical Sciences Graduate Program. In addition to coursework, the Ph.D. degree requires completion of an acceptable dissertation in a program of study designed by the student with Faculty Advisory Committee approval.

1. A minimum of 90 credit hours of graduate level courses including research and dissertation.

2. Completion of the following graduate level courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIMD 501</td>
<td>Scientific Discovery I</td>
<td>6</td>
</tr>
<tr>
<td>BIMD 502</td>
<td>Scientific Discovery II</td>
<td>6</td>
</tr>
<tr>
<td>BIMD 510</td>
<td>Basic Biomedical Statistics (fulfills the scholarly tool requirement)</td>
<td>2</td>
</tr>
<tr>
<td>BIMD 516</td>
<td>Responsible Conduct of Research</td>
<td>2</td>
</tr>
<tr>
<td>BIMD 518</td>
<td>Grant Writing</td>
<td>2</td>
</tr>
<tr>
<td>BIMD 590</td>
<td>Research</td>
<td>at least 50</td>
</tr>
<tr>
<td>BIMD 999</td>
<td>Dissertation</td>
<td>6</td>
</tr>
</tbody>
</table>

3. The optional transcriptable subplan (Specialization) in Neuroscience requires completion of the following 5 courses (10 credits):

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIMD 520</td>
<td>Principles of Neuroanatomy</td>
<td>2</td>
</tr>
<tr>
<td>BIMD 521</td>
<td>Neurophysiology</td>
<td>2</td>
</tr>
<tr>
<td>BIMD 522</td>
<td>Principles of Neuropsychology</td>
<td>2</td>
</tr>
<tr>
<td>BIMD 523</td>
<td>Neurochemical Basis of the Nervous System</td>
<td>2</td>
</tr>
<tr>
<td>BIMD 524</td>
<td>Neurodegenerative Diseases and Pathophysiology</td>
<td>2</td>
</tr>
</tbody>
</table>

4. The optional transcriptable subplan (Specialization) in Microbiology and Immunology requires completion of the following 2 courses (4 credits):

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIMD 530</td>
<td>Components of the Immune System</td>
<td>2</td>
</tr>
<tr>
<td>BIMD 531</td>
<td>Components of Microbial Pathogenesis</td>
<td>2</td>
</tr>
</tbody>
</table>

and also requires completion of 5 credits chosen from the following courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIMD 532</td>
<td>Microbial Gene Regulation</td>
<td>1</td>
</tr>
<tr>
<td>BIMD 533</td>
<td>Microbial Membranes and Transport</td>
<td>1</td>
</tr>
<tr>
<td>BIMD 534</td>
<td>Microbial Cell Structure and Function</td>
<td>1</td>
</tr>
<tr>
<td>BIMD 535</td>
<td>Bacterial Host: Pathogen Interactions</td>
<td>1</td>
</tr>
<tr>
<td>BIMD 536</td>
<td>Molecular Biology and Pathogenesis of Viruses</td>
<td>1</td>
</tr>
<tr>
<td>BIMD 537</td>
<td>Host-Pathogen Interactions involving Eukaryotic Microbes (Parasites/Fungi)</td>
<td>1</td>
</tr>
<tr>
<td>BIMD 538</td>
<td>Immunological Disorders</td>
<td>1</td>
</tr>
</tbody>
</table>

5. Students who choose not to complete a subplan must complete a minimum of 6 credit hours of graduate level elective courses selected from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANAT 513</td>
<td>Gross Anatomy</td>
<td>6</td>
</tr>
<tr>
<td>ANAT 517</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>ANAT 521</td>
<td>Principles of Developmental Biology</td>
<td>3</td>
</tr>
<tr>
<td>ANAT 522</td>
<td>Neuroscience</td>
<td>6</td>
</tr>
<tr>
<td>ANAT 591</td>
<td>Special Topics in Anatomy and Cell Biology</td>
<td>1-3</td>
</tr>
<tr>
<td>BMB 533</td>
<td>Advanced Topics</td>
<td>1-3</td>
</tr>
<tr>
<td>MBIO 501</td>
<td>Molecular Virology</td>
<td>2</td>
</tr>
<tr>
<td>MBIO 504</td>
<td>Microbial Physiology</td>
<td>2</td>
</tr>
<tr>
<td>MBIO 508</td>
<td>Microbial Pathogenesis</td>
<td>2</td>
</tr>
<tr>
<td>MBIO 509</td>
<td>Immunology</td>
<td>3</td>
</tr>
<tr>
<td>MBIO 512</td>
<td>Microbial Genetics</td>
<td>2</td>
</tr>
<tr>
<td>MBIO 515</td>
<td>Advanced Topics</td>
<td>2</td>
</tr>
<tr>
<td>MBIO 519</td>
<td>Advanced Immunology</td>
<td>2</td>
</tr>
<tr>
<td>PPT 500</td>
<td>Principles of Physiology and Pharmacology</td>
<td>6</td>
</tr>
<tr>
<td>PPT 503</td>
<td>Advanced Pharmacology or Physiology</td>
<td>3</td>
</tr>
<tr>
<td>PPT 505</td>
<td>Research Techniques</td>
<td>1</td>
</tr>
<tr>
<td>PPT 511</td>
<td>Biochemical and Molecular Mechanisms of Pharmacology</td>
<td>3</td>
</tr>
<tr>
<td>PPT 512</td>
<td>Special Topics in Pharmacology, Physiology and Therapeutics</td>
<td>1</td>
</tr>
<tr>
<td>PPT 525</td>
<td>Advanced Renal Physiology</td>
<td>3</td>
</tr>
<tr>
<td>PPT 526</td>
<td>Advanced Respiratory Physiology</td>
<td>3</td>
</tr>
<tr>
<td>PPT 527</td>
<td>Advanced Neurophysiology</td>
<td>3</td>
</tr>
<tr>
<td>PPT 528</td>
<td>Advanced Endocrinology</td>
<td>3</td>
</tr>
<tr>
<td>PPT 529</td>
<td>Adv Cardiovascular Physiology</td>
<td>3</td>
</tr>
<tr>
<td>PPT 530</td>
<td>Advanced Neurochemistry</td>
<td>3</td>
</tr>
<tr>
<td>PPT 535</td>
<td>Mechanisms of Neurodegenerative Disorders</td>
<td>3</td>
</tr>
<tr>
<td>PPT 540</td>
<td>Molecular Neuropharmacology</td>
<td>3</td>
</tr>
<tr>
<td>BIMD 520</td>
<td>Principles of Neuroanatomy</td>
<td>2</td>
</tr>
<tr>
<td>BIMD 521</td>
<td>Neurophysiology</td>
<td>2</td>
</tr>
<tr>
<td>BIMD 522</td>
<td>Principles of Neuropsychology</td>
<td>2</td>
</tr>
<tr>
<td>BIMD 523</td>
<td>Neurochemical Basis of the Nervous System</td>
<td>2</td>
</tr>
<tr>
<td>BIMD 524</td>
<td>Neurodegenerative Diseases and Pathophysiology</td>
<td>2</td>
</tr>
<tr>
<td>BIMD 530</td>
<td>Components of the Immune System</td>
<td>2</td>
</tr>
<tr>
<td>BIMD 531</td>
<td>Components of Microbial Pathogenesis</td>
<td>2</td>
</tr>
<tr>
<td>BIMD 532</td>
<td>Microbial Gene Regulation</td>
<td>1</td>
</tr>
<tr>
<td>BIMD 533</td>
<td>Microbial Membranes and Transport</td>
<td>1</td>
</tr>
<tr>
<td>BIMD 534</td>
<td>Microbial Cell Structure and Function</td>
<td>1</td>
</tr>
<tr>
<td>BIMD 535</td>
<td>Bacterial Host: Pathogen Interactions</td>
<td>1</td>
</tr>
<tr>
<td>BIMD 536</td>
<td>Molecular Biology and Pathogenesis of Viruses</td>
<td>1</td>
</tr>
<tr>
<td>BIMD 537</td>
<td>Host-Pathogen Interactions involving Eukaryotic Microbes (Parasites/Fungi)</td>
<td>1</td>
</tr>
<tr>
<td>BIMD 538</td>
<td>Immunological Disorders</td>
<td>1</td>
</tr>
</tbody>
</table>

6. A student must obtain at least a "B" in all required courses in order to remain in good standing in the graduate program. If less than a "B" is received, the student will be given the opportunity to remediate in a manner determined by the course director. If remediation is unsuccessful, the student may petition the Graduate Faculty to take the course a second time. In the event that the student is unable to raise the grade to at least a "B", the student must petition the Graduate Faculty to be allowed to remain the program.

7. Students must maintain a minimum 3.0 GPA in accordance with School of Graduate Studies guidelines (UND Graduate and Undergraduate Academic Catalog).

8. Students must successfully complete the comprehensive examination.

9. Students must fulfill the teaching requirement as defined by the student's Faculty Advisory Committee in consultation with the Department Chair and the Director of Graduate Studies in Biomedical Sciences.

10. Research and Dissertation: The Ph.D. degree requires completion of a dissertation based on the results of a project completed by the graduate student under the guidance of a faculty advisor. The project must represent an original and independent investigation by the student. It is expected that the student will publish at least one first author peer-reviewed manuscript in a scientific or academic journal prior to the defense of their dissertation. The dissertation prepared by the candidate must be presented orally in a public forum and defended before the Faculty Advisory Committee and the Departmental Graduate Faculty and will be open to all members of the academic community.

Master of Science in Biomedical Sciences

Admission Requirements

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. Completion of a four-year Bachelor’s degree or equivalent from a recognized college or university as described in the UND Undergraduate
and Graduate Academic Catalog. Exceptions must be approved by the Dean of the School of Graduate Studies.

2. Coursework: Admission into the Biomedical Sciences Graduate Program is dependent upon the applicant’s demonstration of effective academic skills and appropriate undergraduate training. Ideally, the applicant will have completed the following coursework:

- General Biology with laboratory
- General Chemistry with laboratory
- Organic Chemistry with laboratory
- Physics with laboratory
- Biochemistry or equivalent
- Calculus
- Advanced undergraduate coursework in at least one of the following areas: molecular biology, cell/developmental biology, genetics, neuroscience, biochemistry, microbiology, immunology, anatomy, or physiology.

3. Applicants must have a cumulative undergraduate GPA of at least 3.0/4.0. Applicants with previous graduate education should have a cumulative GPA of 3.5/4.0 in their graduate level course work. Graduate Record Examination scores: Applicants must submit Graduate Record Examination scores. The General test is required; the Subject test is strongly recommended. The Biochemistry, Cell and Molecular Biology, Biology, or Chemistry subject tests are acceptable. Preference for admission will be given to applicants whose averaged test scores are at or above the 50th percentile.

4. International applicants must satisfy the School of Graduate Studies English Language Proficiency Requirements.

5. A Statement of Goals must be included with the application materials. This statement will describe the student’s academic achievements, research experience and accomplishments, career goals, and objectives for applying to the Biomedical Sciences Graduate Program.

6. Three letters of recommendation addressing the student’s academic performance and research or professional experience are required to complete the application. At least two letters must be from faculty having direct knowledge of the student’s academic capabilities.

7. Preference will be given to students who can demonstrate undergraduate research and/or a record of scholarly publication or other relevant experience.

**Degree Requirements**

Students seeking the Master of Science degree in the Biomedical Sciences Graduate Program must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Biomedical Sciences Graduate Program. In addition to course work, the M.S. degree requires completion of an acceptable thesis in a program of study designed by the student with Faculty Advisory Committee approval.

1. A minimum of 30 credit hours of graduate level courses including research and thesis.

2. Completion of the following core graduate courses:

- **BIMD 501** Scientific Discovery I 6
- **BIMD 510** Basic Biomedical Statistics (fulfills the scholarly tool requirement) 2
- **BIMD 516** Responsible Conduct of Research 2
- **BIMD 590** Research at least 8
- **BIMD 998** Thesis 4

3. Completion of a minimum of 4 credit hours of graduate level elective courses selected from the following:

- **ANAT 513** Gross Anatomy 6
- **ANAT 517** 3
- **ANAT 521** Principles of Developmental Biology 3
- **ANAT 522** Neuroscience 6
- **ANAT 591** Special Topics in Anatomy and Cell Biology 1-3
- **BMB 533** Advanced Topics 1
- **MBIO 501** Molecular Virology 2
- **MBIO 504** Microbial Physiology 2
- **MBIO 508** Microbial Pathogenesis 2
- **MBIO 509** Immunology 3
- **MBIO 512** Microbial Genetics 2
- **MBIO 515** Advanced Topics 2
- **MBIO 519** Advanced Immunology 2
- **PPT 500** Principles of Physiology and Pharmacology 6
- **PPT 503** Advanced Pharmacology or Physiology 3
- **PPT 505** Research Techniques 1-3
- **PPT 511** Biochemical and Molecular Mechanisms of Pharmacology 3
- **PPT 512** Special Topics in Pharmacology, Physiology and Therapeutics 2
- **PPT 525** Advanced Renal Physiology 3
- **PPT 526** Advanced Respiratory Physiology 3
- **PPT 527** Advanced Neurophysiology 3
- **PPT 528** Advanced Endocrinology 3
- **PPT 529** Adv Cardiovascular Physiology 3
- **PPT 530** Advanced Neurochemistry 3
- **PPT 535** Mechanisms of Neurodegenerative Disorders 3
- **PPT 540** Molecular Neuropharmacology 3
- **BIMD 520** Principles of Neuroanatomy 2
- **BIMD 521** Neurophysiology 2
- **BIMD 522** Principles of Neuropharmacology 2
- **BIMD 523** Neurochemical Basis of the Nervous System 2
- **BIMD 524** Neurodegenerative Diseases and Pathophysiology 2
- **BIMD 530** Components of the Immune System 2
- **BIMD 531** Components of Microbial Pathogenesis 2
- **BIMD 532** Microbial Gene Regulation 1
- **BIMD 533** Microbial Membranes and Transport 1
- **BIMD 534** Microbial Cell Structure and Function 1
- **BIMD 535** Bacterial Host: Pathogen Interactions 1
- **BIMD 536** Molecular Biology and Pathogenesis of Viruses 1
- **BIMD 537** Host-Pathogen Interactions involving Eukaryotic Microbes (Parasites/Fungi) 1
- **BIMD 538** Immunological Disorders 1

4. A student must obtain at least a “B” in all required courses in order to remain in good standing in the graduate program. If less than a “B” is received, the student will be given the opportunity to remediate in a manner determined by the course director. If remediation is unsuccessful, the student may petition the Graduate Faculty to take the course a second time. In the event that the student is unable to raise the grade to at least a “B”, the student must petition the Graduate Faculty to be allowed to remain the program.

5. Students must maintain a minimum 3.0 GPA in accordance with School of Graduate Studies guidelines (UND Graduate and Undergraduate Academic Catalog).

6. In addition to course work, the Master of Science degree requires completion of a thesis-based scholarly project completed by the graduate student under the guidance of a faculty advisor. It is expected that the results of the scholarly work will be publishable in a peer-reviewed journal.

**Business Administration**

M.B.A. (p. 354)

M.B.A./J.D. (p. 355)
ACCT Courses

ACCT 501. Seminar in Accounting Issues. 3 Credits. Addresses current issues in accounting and develops appropriate professional judgment through researching and applying accounting standards. Prerequisite: Permission of MAcc Director. F/S.

ACCT 502. Financial Reporting and Decision Making. 3 Credits. This course provides an overview of financial accounting terminology and concepts, financial statements, and the financial reporting process. Emphasis is placed on the decision usefulness of financial statement information and the financial reporting process as a means of communicating information about firms. Prerequisite: Successful completion of Ivy Software's "Business Math and Statistics for Graduate" self-paced course or demonstrated equivalent competencies. F/S.

ACCT 503. Advanced Financial Accounting. 3 Credits. Accounting for inter-corporate investments, business combinations, and other advanced financial accounting topics. Prerequisite: Permission of MAcc Director. F/S.

ACCT 504. Seminar in Auditing. 3 Credits. Expands understanding of the auditing function and provides a framework for analyzing contemporary auditing and assurance issues. Prerequisite: Permission of MAcc Director. F.

ACCT 506. Accounting Systems. 3 Credits. This course examines business processes and controls within the context of enterprise resource planning systems (ERP), with an emphasis on the financial cycle. Prerequisite: Permission of MAcc Director. S.

ACCT 507. Advanced Managerial Accounting. 3 Credits. Functional uses of accounting in management of the enterprise.

ACCT 508. Fraud Examination. 3 Credits. Focuses on understanding types of fraud as well as collecting and evaluating evidence relating to preventing and detecting frauds. Evidence gathering methods will include the examination of documents, publicly available information, and standard practices for interviews and interrogations. Prerequisite: ACCT 405 or equivalent.

ACCT 509. Accounting Information for Decision and Control. 3 Credits. Management accounting concepts and their application in internal planning, control, and decision-making. Prerequisite: ACCT 502. F/S.

ACCT 510. Taxation of Individuals. 3 Credits. This graduate-level course covers federal taxation of individuals. Prerequisite: Permission of MAcc Director. F.

ACCT 511. Taxation of Businesses. 3 Credits. This graduate-level course covers federal taxation of business organizations. Prerequisite: Permission of MAcc Director. S.

ACCT 512. Accounting for Governments & Nonprofits. 3 Credits. This course covers accounting for governmental and nonprofit entities, including fund accounting. Prerequisite: Permission of MAcc Director. S.

ACCT 521. Financial Accounting I. 3 Credits. This is a first course in financial accounting for graduate students that has a preparer orientation, but also provides a foundation for analyzing financial statements. Specific content focuses on assets and current liabilities as well as the formats and uses of the primary financial statements. Prerequisite: Permission of MAcc Director. F/S,SS.

ACCT 522. Financial Accounting II. 3 Credits. This is the second course in the financial accounting sequence for graduate students. The course has a preparer orientation, but also provides a foundation for analyzing financial statements. Prerequisite: ACCT 521 or Permission of MAcc Director. F/S,SS.

ACCT 523. Financial Accounting III. 3 Credits. This course is part of the graduate financial accounting sequence. The course has a problem-solving orientation, and involves the application of accounting principles to complex transactions and topics including deferred taxes, leases, and pensions. Prerequisite: ACCT 522 or permission of the Director of the Master of Accountancy program. F/S,SS.

ACCT 525. Audit & Assurance Services. 3 Credits. Examines the role that assurance services play in improving the quality of information and its usefulness for decision making. Materiality and risk assessment are considered along with processes and controls in relation to financial statement audits. Prerequisites: ACCT 522 and ACCT 506, or Permission of MAcc Director. S.

ACCT 526. Advanced Business Law for Accountants. 3 Credits. Examines legal topics relevant to accountants and financial professionals including securities law, commercial paper, secured transactions, professional liability, corporations and partnerships. Prerequisite: Permission of MAcc Director. S.

ACCT 527. IT Governance and Audit. 3 Credits. This course introduces topics related to information technology governance and audit, and their roles in internal control and risk management in accounting. Prerequisite: Admission into the Master of Accountancy program or permission of the Director of the Master of Accountancy program. On demand.

ACCT 560. Personal Accountability & Ethics. 3 Credits. Examines foundations of ethical behavior with an emphasis on personal accountability. Issues, regulations, and cases relevant to accountants and auditors are examined. Approaches for dialogue in the context of ethical issues are introduced. Includes a service project component. Prerequisite: Permission of MAcc Director. F.

ACCT 561. Accounting Ethics and Leadership. 3 Credits. Accounting professionals have a special role in assuring the quality of financial reports, and in conveying useful information to stakeholders throughout society. Identifying, and being able to effectively respond to, ethical issues are important skills for accounting professionals. This course explores the concepts of ethical thinking, professional behavior, integrity, and independence, as well as specific principles as identified in the Codes of Professional Conduct. The ethical tone of an organization is set by its leaders, and thus an understanding of leadership, and how managers can effectively lead others in a responsible manner, is important to understand from both the perspective of being a leader, and working with leaders in an organization. Prerequisite: Admission into the Master of Accountancy program or permission of the Director of the Master of Accountancy program. F/S,SS.

ACCT 575. Special Topics. 3 Credits. Specific topic will vary from offering to offering at the discretion of the department. Prerequisites and/or corequisites may be required depending upon the special topic selected. Course may be repeated up to a total of nine credits with permission of department. Prerequisite: Permission of department. Repeatable to 9 credits.

ACCT 590. Contemporary Readings in Accounting. 2 Credits. Review of outstanding monographs and other writings in the field of accounting.

ACCT 591. Accounting Research. 1-6 Credits. Individual student projects designed to develop skills in accounting research.

ACCT 592. Research in Federal Tax. 1-4 Credits. Research in Federal Income Tax with emphasis on corporations and shareholders. Prerequisite: ACCT 411 or equivalent. Repeatable to 4 credits.

ACCT 593. Research in Business Law. 1-4 Credits. Individual projects designed to develop basic skills in legal research.

ACCT 597. Graduate Accounting Internship. 1-6 Credits. Compensated work experience in various areas of accounting. Must follow processes and meet internship requirements of the Department of Accountancy and CoBPA. Prerequisite: Permission of MAcc Director. Repeatable to 6 credits. S/U grading. F/S,SS.


ACCT 997. Independent Study. 2 Credits. The independent study requires the student to investigate a topic in accounting and to prepare a formal report satisfactory to the MAcc Program Director.

ACCT 998. Thesis. 1-15 Credits.
Undergraduate Courses for Graduate Credit

ACCT 309. Accounting Information Systems. 3 Credits.
The application of systems design and use from the accountant’s perspective. Coverage includes computerized and manual accounting systems, elements of internal control, flowcharting, and the interface of accounting and management information systems. Prerequisites: ACCT 301 and Junior or Senior Standing; declared CoBPA majors only. F.S.

ACCT 312. Fund Accounting. 3 Credits.
Financial accounting, control, and reporting for governmental and not-for profit entities. Prerequisites: ACCT 201 and ACCT 218; Junior or Senior Standing; declared CoBPA majors only. F.S.

ACCT 320. Cost Accounting. 3 Credits.
Principles and techniques used to account for and analyze costs incurred to produce products or services. Prerequisite: ACCT 201. Prerequisite or Corequisite: ACCT 218. F.S.

ACCT 401. Advanced Accounting. 3 Credits.
Special problems in accounting including consolidated statements, partnerships, and foreign exchange. Prerequisites: ACCT 302; Junior or Senior Standing; declared CoBPA majors only. F.S.

ACCT 403. Contemporary Accounting Theory. 3 Credits.
A study of the emerging issues and the problems facing the accounting profession with special emphasis on the authoritative pronouncements as designated by the American Institute of CPAs and the Financial Accounting Standards Board. S-U grading not allowed. Prerequisite or Corequisite: ACCT 401 or consent of instructor; declared CoBPA majors only. F.S.

ACCT 405. Assurance Services. 3 Credits.
Explores methods of improving the quality of information or its context for decision makers. Examples include assurances on the reliability of financial statements, the processes and controls used to manage and operate businesses, assertions and agreements made to third parties, and regulatory compliance. Prerequisites: ACCT 302, ACCT 309, ECON 210; Junior or Senior Standing; declared CoBPA majors only. F.S.

ACCT 406. Independent Assurance. 3 Credits.
Auditing and assurance theory as applied by independent accountants. Prerequisites: ACCT 405 or consent of instructor; declared CoBPA majors only. S.

ACCT 410. Federal Individual Income Tax. 3 Credits.
Federal income tax relating to individuals to include the more complex tax situations. A computerized individual income tax preparation is used as a part of the course. Prerequisites: ACCT 201; Junior or Senior Standing; declared CoBPA majors only. F.S.

ACCT 411. Business Income Taxation. 3 Credits.
Federal income tax relating to corporations and partnerships. Introduction to estate and gift tax and fiduciary income tax. Prerequisites: ACCT 302; Senior Standing; declared CoBPA majors only. F.S.

ACCT 416. Business Law for Accountants. 3 Credits.
Both foundational and advanced topics in business law relevant for the practice of public accountancy including agency law, contracts, negotiable instruments, ethics, legal representation in business, and the impact of selected governmental regulations on businesses. Prerequisites: Declared CoBPA majors or students admitted to the Master of Accountancy program, only. F,S,SS.

BADM Courses

BADM 500. The Successful MBA—Executive Skills. 2 Credits.
Effective leadership requires a diverse set of skills; it requires vision, strategy, planning and inspiration, yet all of these skills are hinged on communication. Executives must communicate across various channels, use multiple modes, and communicate with individuals and teams. This course presents communication as integral to management strategy and as a critical component for success in the workplace. In this course we examine the fundamental skills necessary to succeed as an executive, examine fundamental communication strategies, and then put them into practice. Further, because effective group communication is a necessity in today’s workplace we will learn and practice skills in designing presentations. The schedule will reflect eight learning modules that discuss professionalism, managing impressions, crafting arguments, managing conflict, leveraging diversity, working in teams, presenting in groups, and reflecting on skills, motivators and influences. F,S,SS.

BADM 502. Business Research Methods. 3 Credits.
A study of the methodology of research involving research design, problem definition, information sources, data collection instruments, and the organization and writing of a research paper. Prerequisite: Completion of MBA foundation courses or consent of instructor.

BADM 597. Graduate Cooperative Education. 1-3 Credits.
A practical experience with an employer closely associated with the student’s academic area. A written report describing the student’s job related experiences will be prepared. Prerequisite: Approval of MBA director. Repeatable to 3 credits. S/U grading.

BADM 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

BADM 997. Independent Study. 2 Credits.

BADM 998. Thesis. 4 Credits.

ECON Courses

ECON 503. Government and Business. 3 Credits.

ECON 504. Microeconomic Theory & Applications. 3 Credits.

ECON 505. Macroeconomic Theory & Applications. 3 Credits.

ECON 506. Econometrics. 3 Credits.

ECON 510. Time Series Methods & Applications. 3 Credits.

ECON 514. Advanced Managerial Economics. 3 Credits.

ECON 524. Advanced International Economics. 3 Credits.

ECON 534. Further Topics in Econometrics. 3 Credits.

ECON 545. Quantitative Methods for Impact Evaluation & Causal Inference. 3 Credits.

This course aims to familiarize the student with the current literature on the economics and econometrics of policy and program evaluation. Prerequisites: ECON 506. S.
ECON 565. Demographic Methods for Economics. 3 Credits.
We examine the three key demographic processes: mortality, fertility, and migration. The course emphasis will be on model development for each of the processes. Applications include economic policy issues such as pensions, medical insurance, and other current issues. Prerequisite: ECON 210. SS.

ECON 575. Advanced Special Topics. 1-3 Credits.
Topics of course will change from semester to semester but will typically emphasize an important aspect of economic theory or a significant issue in economic policy. Repeatable to 6 credits with different topics. Repeatable to 6 credits.

ECON 580. Economic Development: Global, National, and Regional Issues. 3 Credits.
The first part of this course focuses on growth theories, globalization and economic development and sustainable growth among less developed, developing, and more developed countries, as well as countries in transition to market economies. The second part of the course specifically examines economic development for advanced nations, incorporating rural, urban and regional economic analysis. Issues such as rural technology, employment, poverty, housing, transportation, location problems, industrialization, urbanization and sustainable growth in North Dakota and North Central Region are explored. Prerequisite: Department consent. F.

ECON 592. Research in Economics. 2-3 Credits.
Research work and use of original documents; collecting of material and preparing of special topics and bibliographies; familiarizing the student with government publications and other material available for study of economic problems.

ECON 596. Applied Economics Research Seminar. 3 Credits.
Seminar course intended to strengthen and further develop essential skills of research and formal presentation (written and oral) for both academic and professional audiences. Students will apply these skills to the development of their Individual Independent Study or Thesis Project Proposal. Enrollment is restricted to MSAE degree students who plan to complete their Independent Study or Thesis in the following academic year. Prerequisites: ECON 504, ECON 505, and ECON 506. SS.

ECON 597. Economic Research Internship. 1-3 Credits.
An internship is designed to provide the student with an opportunity for participating in a supervised work experience directly related to the field of training. Students will work closely with the program adviser in planning the internship with an approved cooperating institution. Prerequisite: Permission of program director. Repeatable to 3 credits. F.S.SS.

ECON 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

ECON 997. Independent Study. 3 Credits.
The independent study is a capstone for MSAE students on the non-thesis track. The course requires the student to investigate a topic or research question in applied economics that is assigned by the instructor. The student will prepare a research paper demonstrating his/her ability to creatively apply the various methods and perspectives taught in the MSAE program in addressing the assigned problem. Students will also be required to develop a presentation for their paper. Prerequisites: ECON 504, ECON 505, and ECON 506. F.S.

ECON 998. Thesis. 4 Credits.
The thesis is an original research project completed under the supervision of a thesis committee.

ECON 314. Labor Economics and Labor Relations. 3 Credits.
A survey of the nature and causes of the economic problems of the American wage and salary earner and of the attempts of wage earners and society, through organizations and legislation, to alleviate these problems. The course comparatively surveys the history and systematic theories of labor movements and the market and institutional influences on wages and employment. Particular emphasis will be placed on the law of industrial relations, employment and income access, and the adjustment of labor disputes. Prerequisites: ECON 201 and ECON 202. F.

ECON 341. Labor Economics and Labor Relations. 3 Credits.
This course is an introduction to econometrics, the joint area of economics and statistics dealing with the application of statistics to economic problems. The course objectives are to acquire a basic understanding of the theory and methods of econometrics and to gain practical experience in utilizing these methods. The students will use the tools developed in the course in homework and written assignments so that they can develop an insight to theory and its application. Prerequisites: ECON 201, ECON 202 and ECON 210. F.

ECON 411. Economic Forecasting. 3 Credits.
An introduction to Economics Forecasting and Time Series Analysis. The course will cover specifications and estimation of ARMA models, seasonality, non-stationarity, unit roots and forecast evaluations. Empirical applications are used throughout the course. Prerequisite or Corequisite: ECON 410 or ECON 506. S.

ECON 416. Mathematics for Economists. 3 Credits.
Study of mathematical methods in the areas of introductory calculus and linear algebra, and their application to economic analysis. Mathematical analysis of static and dynamic equilibrium models, growth models, distribution, production functions, cycles, activity analysis, mathematical programming, and model building. Prerequisite: MATH 146 or MATH 165. Prerequisite or Corequisites: ECON 308. F.

ECON 438. International Money and Finance. 3 Credits.
Identification of key international financial concepts and analysis of their relationships in the international money and capital markets; determination of the balance of payments and exchange rates; and examination of alternative organizations of the international monetary system. Prerequisite: ECON 303. F.

ENTR Courses

ENTR 575. Special Topics. 3 Credits.
Specific topic will vary from offering to offering at the discretion of the department. Departmental permission will be required for enrollment. Course may be repeated once with topic change. Prerequisite: Departmental permission. Repeatable to 6 credits.
ENTR 580. Seminar in Social Entrepreneurship. 3 Credits.
Social Entrepreneurship is a rapidly growing, interdisciplinary area of interest that draws on entreprenueural knowledge and skills to craft innovative businesses that address social needs. This course explores current trends in both the private and social sectors, which are creating space for innovation and opportunities for individuals to apply their business skills to drive positive and large scale social change. We will explore major opportunities and challenges presented by social enterprise through examining a variety of models ranging from social purpose to the creation of social ventures. Students will work in teams to conduct a feasibility study for a social entrepreneurship related project. Through the project, students will enhance and apply their understanding of business strategies and processes that enhance sustainability and social impact. These strategies can include launching revenue-generating enterprises, developing a marketing plan for an existing social enterprise, or creating strategic partnerships with the private sector. Students will also gain practical skills necessary to develop and manage a high-impact social venture. F, odd years.

FIN Courses
FIN 501. Managerial Finance. 3 Credits.
The development of financial decision-making skills, using the case-analysis method, through application of financial theory to topical areas of analysis, planning, control, asset management, financial instruments, markets, capital structure, dividend policy, cost of capital, etc. Prerequisite: Successful completion of Ivy Software’s “Understanding Corporate Finance” self-paced course or demonstrated equivalent competencies. F.S.

FIN 520. Investment Theory and Management. 3 Credits.
An introductory course designed for MBA students in the study of the usage and valuation of the major investment vehicles popular today. Although the ultimate objective is to develop a conceptual framework in which the student can expand his or her knowledge of the investment field, the course is taught in a practical fashion and incorporates materials from both the Chartered Financial Analyst (CFA) and Certified Financial Planner (CFP) curricula. Prerequisite: FIN 501 or consent of instructor.

FIN 575. Special Topics. 3 Credits.
Specific topic will vary from offering to offering at the discretion of the department. Departmental permission will be required for enrollment. Prerequisites and/or corequisites may be required depending upon the special topic selected. Course may be repeated up to a total of nine credits with permission of department. Prerequisite: Departmental permission. Repeatable to 9 credits.

Undergraduate Courses for Graduate Credit
FIN 420. Investment Analysis and Portfolio Management. 3 Credits.
Comprehensive study of methods used to evaluate securities. Includes formulation of investment strategy and analysis, design of portfolios for classes of individual investors and institutions, fundamental analysis and portfolio performance evaluation. Extensive use of financial databases and software. Prerequisites: FIN 340 and FIN 360; Junior or Senior Standing; declared CoBPA majors only. F.

FIN 475. Cases in Managerial Finance. 3 Credits.
Introduces students to construction and utilization of financial management decision models using case study examples. Topics evaluated include working capital management, capital budgeting, cost of capital, capital structure, dividend policy, valuation, risk-return, and special topics of financial management. Students are required to develop original simulation models, prepare formal case reports, and orally and visually present their results. Prerequisites: FIN 340 and FIN 360; Junior or Senior Standing; declared CoBPA majors only. S.

ISBC Courses
ISBC 510. Business Intelligence. 3 Credits.
A business intelligence (BI) system is an information system that supports decision making process. BI is also about creating strategic value for organizations based on data. This course provides critical thinking and self-learning abilities by discovering the business intelligence and data analytic challenges. The expected outcome of the course will allow each student to have a solid understanding of current and emerging issues and best practices of data visualization and data analytics. Students will also gain a strong business process analysis experience. The course will challenge each student in her/his ability to use big data, predictive data analysis, data gathering techniques, data warehouse, knowledge management, data mart, and data mining systems. These challenges are becoming a prevalent factor in the present turbulent business environment. Prerequisite: Admission to the MBA program or department consent required. F.S.

ISBC 517. Advanced Accounting Systems. 3 Credits.
An advanced study of integrated information systems and how these affect business decisions. Prerequisite: ACCT 309 or permission of instructor.

ISBC 520. Communication for the Professional. 3 Credits.
Examines theory and research relevant to understanding the communication process. Topics include strategies of organizing, globalization, technology, power, and diversity.

ISBC 590. Special Topics. 3 Credits.
Specific topic will vary from offering to offering at the discretion of the department. Departmental permission will be required for enrollment. Prerequisites and/or corequisites may be required depending upon the special topic selected. Course may be repeated up to a total of 6 credits with permission of department. Prerequisite: Department permission. Repeatable to 6 credits.

Undergraduate Courses for Graduate Credit
ISBC 330. Database Management. 3 Credits.
This course covers the fundamentals of database design and management. Topics include, but not limited to, database models, database normalization, entity-relationship diagramming, SQL and database implementation and management. The course will provide a balance of theory and practical applications and will culminate in database implementation exercises conducted by students. F.S.

ISBC 430. Database Analytics. 3 Credits.
This course equips students with an understanding of techniques in data analytics with particular emphasis on unstructured data. Coverage includes, but not limited to, database analytics, PL/SQL, advanced SQL, business intelligence, unstructured big data analytics, Hadoop framework in business, data visualization, data warehousing, NoSQL, and in-memory database system. Prerequisite or Corequisite: ISBC 330. F.S.

MGMT Courses
MGMT 501. Quantitative Analysis for Management Decisions. 3 Credits.
The topic of quantitative business modeling is relevant to all business professionals. Management in today’s turbulent economic times requires a full breadth of management skills and capabilities. This course provides comprehensive coverage of both traditional management skills and new competencies needed in a turbulent environment characterized by economic turmoil and general uncertainty of the future. This course is designed for any manager who is engaged in solving difficult business problems. The key to problem solving is knowing how to select and then use the right tools. The primary goals of this course are to provide a variety of quantitative models that should be useful in solving business problems, explain how they work, and show how the decision maker can apply and interpret them. This course covers various topics, such as Linear Programming, Sensitivity Analysis, Network Models, Integer Programming, Nonlinear Programming, and Forecasting. Spreadsheet-based tools and techniques will be extensively utilized in building various decision models for effective decision making in this course. Because Excel currently offers the best collection of built-in analytical capabilities, it will be used with this course. Prior experience with Excel is certainly helpful, but it is not required. Prerequisites: Admission to the MBA program and ECON 506. S,SS.
MGMT 505. Organization Leadership and Ethics. 2 Credits.
This course will explore concepts of leadership and ethics in organizations and business. Students will examine major theories of leadership and their application to practice in groups and organizations, models of ethical thinking and behavior, and how managers can effectively lead others in a responsible manner. Prerequisite: Graduate standing.

MGMT 515. Advanced Managerial Theory. 3 Credits.
This course will explore the management of people and organizations. Students will examine concepts of the behavior of individuals and groups within organizations, motivation, decision making, conflict, organization design, and human resource management, and explore the application of theories in management practice. Prerequisite: Graduate standing. F.S.

MGMT 545. Strategic Supply Chain Management. 3 Credits.
Contemporary supply chains are complex systems that must be constantly adapted with the changing environment in which they are functioning. This course will explore the management of supply chains, including concepts of supply chain networks, supply chain strategies, and some analytic tools for supply chain performance. It is the vital responsibility of supply chain managers to continuously improve their firm’s competitive position in the marketplace. Students will examine how supply chains can be organized and made to operate both in an effective (strategic) and efficiently (operational) manner to satisfy the market, customer demand, and supply chain trading partners. Prerequisites: Admission to the MBA program and completion of "Business Math and Statistics" course from IVY Software.

MGMT 575. Special Topics. 3 Credits.
Specific topic will vary from offering to offering at the discretion of the department. Departmental permission will be required for enrollment. Prerequisites and/or corequisites may be required, depending upon the special topic selected. Course may be repeated up to a total of 9 credits with permission of department. Prerequisites: Departmental permission. Repeatable to 9 credits.

MGMT 585. Advanced Strategic Management. 3 Credits.
An integrating course designed to develop coordinating ability and experience in the decision-making process. Taught from the point of view of the top management and by the case method, the course develops understanding of an overall point of view, through analysis of actual business situations, and an appreciation of the relations of the production department to other departments and to the business as a whole. Concluding cases place emphasis on the responsibilities of business enterprise to the community and to society generally. Prerequisites: ACCT 509, MGMT 515, MRKT 510 and FIN 501, or consent of instructor.

MGMT 596. Individual Research. 2-4 Credits.

MGMT 597. Readings in Management. 1-3 Credits.
Repeatable to 3 credits.

MGMT 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

MGMT 997. Independent Study. 2 Credits.

MGMT 998. Thesis. 1-15 Credits.

Undergraduate Courses for Graduate Credit

MGMT 361. Managerial Negotiations. 3 Credits.
A survey of negotiation, mediation, arbitration, and emerging methods of alternative dispute resolution. Students will be required to engage in small and large group discussions, simulated negotiations and mediations in addition to regular reading assignments. This course is designed to help students understand their bargaining position in a variety of settings, devise negotiating strategies, and build their persuasive abilities and self-confidence in negotiations. Prerequisite: MGMT 300 with grade of C or better. On demand.

MGMT 400. Organizational Theory and Analysis. 3 Credits.
The course is designed to acquaint students with some of the alternative ways in which organizations may be designed to accomplish their tasks. The course reviews the development of organization theories, their current status, and their future. Emphases are placed on the analyses of system theories pertaining to structure, process, and context. Prerequisites: MGMT 300 with grade of C or better, Junior or Senior standing, and declared COBPA majors only. Prerequisite or Corequisite: MGMT 310 with grade of C or better. F.S.

MGMT 407. Wage and Salary Administration. 3 Credits.
The role of a wage and salary administrator is studied. The course focuses on the fundamentals of wage theory, job evaluation and pricing, employee evaluation, individual and group incentive plans, benefits, and managerial/executive compensation. Prerequisites: MGMT 302 with grade of C or better, Junior or Senior standing, and declared COBPA majors only. F.

MGMT 408. Performance Management and Human Resource Management Issues. 3 Credits.
This class explores various performance management approaches used by human resource management professionals and managers to improve work performance in organizations. This course also investigates current issues in the field or human resource management that potentially impact the performance of work. Prerequisites: MGMT 302 with grade of C or better, Junior or Senior standing, and declared COBPA majors only. S.

MGMT 409. Union-Management Relations. 3 Credits.
This course provides the student with an overview of the role of labor unions in contemporary organizations. The primary emphasis of the course is on the collective bargaining process. Students are engaged in simulated collective bargaining processes involving negotiations, mediation, arbitration, and final contractual agreements. Causes of industrial disputes and grievance arbitration are also covered. Prerequisites: MGMT 302 with a grade of C or better, Junior or Senior standing, and declared COBPA majors only. On demand.

MGMT 420. Multinational Management. 3 Credits.
This course is an introduction to the dynamics of management processes encountered in a multinational business setting. It covers comparative management systems and analysis of various environmental conditions for making effective management decisions within a multinational company. Adaptation to different cultures is emphasized as one of the essential components of the successful multinational management equation. Prerequisites: MGMT 300 with a grade of C or better, Junior or Senior standing, and declared COBPA majors only. On demand.

MRKT Courses

MRKT 510. Strategic Market Planning. 3 Credits.
This course is designed to facilitate an understanding of strategic market planning, with specific emphasis on decisions relating to marketing management. Students will develop an understanding of marketing as both a corporate function and a strategic/tactical managerial activity. Specifically, students will develop a realistic logic and application for marketing management and how marketing strategy is informed by marketing research. Special attention will be given to the marketing function as it impacts customer metrics and organizational performance. Prerequisite: BADM 500, F.S.

MRKT 530. Strategic Relationship Marketing. 3 Credits.
This course is designed to facilitate an understanding of strategic relationship marketing with a significant focus on organizational performance and the accountability of the marketing function. Throughout the course, attention will focus on the relational nature of B2B, B2C, and C2C marketplaces and the impacts of firm level marketing decisions upon firm performance measures (KPIs such as market share, sales, profit, call center productivity and efficiency, and customer satisfaction/loyalty). Macro topics covered include relationship, differential advantage, segmentation, buyer behavior, marketing research, demand forecasting, and marketing planning. Specific strategic and tactical decisions examined include the relational outcomes of R&D expenditures, conducting and interpreting marketing research, and marketing mix elements of products, pricing, distribution, sales force and communications decisions. In sum, this course is designed to provide a strategic relational paradigm for understanding B2B, B2C and C2C marketing and provide a "hands on" learning experience in marketing analysis, planning, and decision making towards the end goals of overall firm performance and customer satisfaction. Prerequisite: Graduate standing.

MRKT 540. Marketing Seminar. 3 Credits.
Emerging topics in the field of marketing. Prerequisite: MRKT 305.

MRKT 575. Special Topics. 3 Credits.
Specific topic will vary from offering to offering at the discretion of the department. Departmental permission will be required for enrollment. Prerequisites and/or corequisites may be required depending upon the special topic selected. Course may be repeated up to a total of 9 credits with permission of department. Prerequisites: Departmental permission is required. Repeatable to 9 credits.
MRKT 592. Graduate Research in Marketing. 1-3 Credits. Repeatable to 6 credits. Prerequisites: BADM 502 and consent of instructor. Repeatable to 6 credits.

MRKT 595. Graduate Readings in Marketing. 1-3 Credits. Repeatable to 6 credits. Prerequisites: Consent of instructor is required. Repeatable to 6 credits.

MRKT 996. Continuing Enrollment. 1-12 Credits. Repeatable.

MRKT 997. Independent Study. 2 Credits.

MRKT 998. Thesis. 1-15 Credits.

Undergraduate Courses for Graduate Credit

MRKT 431. Customer Relationship Management (CRM). 3 Credits. This course examines customer relationship management (CRM) and its application in marketing, sales, and service. It will include the use of Microsoft Dynamics CRM and Microsoft Social Engagement. Effective CRM strategies help companies align business process with customer-centric strategies using people, technology, and knowledge. Companies strive to use CRM to optimize the identification, acquisition, growth and retention of desired customers to gain competitive advantage and maximize profit. Anyone interested in working with customers and CRM technology and would like to be responsible for the development of any major aspect of CRM will find this course beneficial. Emphasis is given on conceptual knowledge, real-world projects, and hands-on learning using Microsoft Dynamics CRM software. CRM training modules and software are used throughout the semester. Prerequisites: MRKT 305, Junior or Senior Standing, and declared CoBPA majors only. F,S.

Master of Business Administration

Admission Requirements

1. A four-year bachelor’s degree from a recognized college or university.
2. An overall grade point average of at least 3.00 in the undergraduate degree program or of at least 3.25 for the last two years, or equivalent, of undergraduate work (based on 4.00 scale).
3. Completion of the Graduate Management Admission Test (GMAT) with a score that equals or exceeds an overall total score of 500. In certain circumstances, applicants may substitute the GRE (with similar percentile scores expected to those noted above). This situation will be determined on a case-by-case basis.
4. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.
5. Minimum competence in business math and statistics, accounting, economics, and finance. This competence is normally demonstrated by having a bachelor’s degree in business administration, previous equivalent course work in each of four subject areas, or by successful completion of self-paced boot camp courses on these topics from Ivy Software (https://www.mbaiprepworks.com/local/iomad_signup/signup.php?id=128&code=UNDakota).

M.B.A. Prerequisite Competence

Applicants must demonstrate a minimum competence in business math and statistics, accounting, economics, and finance. Competence in these foundational topics can be demonstrated in three ways:

1. Possessing a bachelor’s degree in business administration, with the grade point requirements stated above.
2. Completion of equivalent course work in the four topics areas, with a grade of “B” (or the equivalent) or better in each course. The MBA Program Director will determine if previous course work meets the expectations for entering students.
3. Successful completion of self-paced online boot camp courses on these topic areas from Ivy Software (https://www.mbaiprepworks.com/local/iomad_signup/signup.php?id=128&code=UNDakota). Students can go directly to Ivy Software’s web site for registration information. Students must achieve a score of 80% or greater in each course in order to successfully complete the prerequisite requirement. Students will have a maximum of 2 attempts to successfully complete each course; students that fail to pass the boot camp course after 2 attempts will be required to complete an undergraduate course judged by the MBA Program Director to be equivalent to that subject, with a grade of “B” (or the equivalent) or better.

Ivy Software Boot Camp Course List

1. Business Math and Statistics
2. Financial Accounting
3. Fundamentals of Economics
4. Understanding Corporate Finance

Degree Requirements

Students seeking a Master’s degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Master of Business Administration Program.

The M.B.A. degree program is an interdisciplinary program taught by the faculty in several departments within the College of Business and Public Administration. The M.B.A. Program Director is responsible for coordinating all aspects of the program. Business courses carrying graduate credit status from the Department of Accounting, Economics and Finance, Marketing, Management, and Political Science and Public Administration, and the School of Entrepreneurship are described elsewhere in the graduate catalog. The M.B.A. degree program requirements are:

1. A minimum of 43 semester credits of academic work. The program includes 34 credit hours of required core course credits and an additional 9 credit hours in a required concentration.
2. The 34 required core course credits are organized into 4 modules: Executive Management, Business Analytics, Financial and Economic Analysis, and Strategy.
3. At least one-half of the credits must be at or above the 500-level. A maximum of one-fourth (usually 9 semester credits) of the credit hours required may be transferred from another institution.
4. The requirement of the final examinations for the M.B.A. degree is satisfied by the successful completion of MGMT 585 Advanced Strategic Management. MGMT 585 Advanced Strategic Management has four prerequisites which MUST be completed prior to enrollment:
   a. ACCT 509 Accounting Information for Decision and Control
   b. FIN 501 Managerial Finance
   c. MGMT 515 Advanced Managerial Theory
   d. MRKT 510 Strategic Market Planning
5. Students are required to make a final presentation to a panel of assurance of learning reviewers during their last semester of study, and maintain an assurance of learning portfolio throughout their program of study.

The M.B.A. curriculum includes the following required courses:

Executive Management Module

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<thead>
<tr>
<th>Course</th>
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<th>Credits</th>
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<tbody>
<tr>
<td>MGMT 505</td>
<td>Organization Leadership and Ethics</td>
<td>2</td>
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<tr>
<td>MGMT 515</td>
<td>Advanced Managerial Theory</td>
<td>3</td>
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<tr>
<td>BADM 500</td>
<td>The Successful MBA--Executive Skills</td>
<td>2</td>
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Business Analytics Module

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<th>Course</th>
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<tbody>
<tr>
<td>ISBC 510</td>
<td>Business Intelligence</td>
<td>3</td>
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<td>ECON 506</td>
<td>Econometrics</td>
<td>3</td>
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<tr>
<td>MGMT 501</td>
<td>Quantitative Analysis for Management Decisions</td>
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Financial and Economic Analysis Module

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<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 502</td>
<td>Financial Reporting and Decision Making</td>
<td>3</td>
</tr>
<tr>
<td>ACCT 509</td>
<td>Accounting Information for Decision and Control</td>
<td>3</td>
</tr>
<tr>
<td>FIN 501</td>
<td>Managerial Finance</td>
<td>3</td>
</tr>
</tbody>
</table>

Strategy Module

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MRKT 510</td>
<td>Strategic Market Planning</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 545</td>
<td>Strategic Supply Chain Management</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 585</td>
<td>Advanced Strategic Management</td>
<td>3</td>
</tr>
<tr>
<td>Concentration</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Total Credits</td>
<td></td>
<td>43</td>
</tr>
</tbody>
</table>

M.B.A. students can choose among the following concentrations:
General Concentration

Students can choose 9 credit hours for the General Concentration chosen from courses offered at the 300-, 400- and 500-level in the areas of Accounting, Economics, Entrepreneurship, Finance, Information Systems and Business Communications, Marketing, Management, and Political Science & Public Administration, as well as other fields within the CoBPA and across UND. MBA students taking courses at the 300- and 400-level for graduate credit are expected to perform at a higher level, both in the quality and quantity of work. All General Concentration courses must be approved by the M.B.A. Program Director prior to enrollment.

Business Analytics Concentration

Students can choose to focus on business analytics beyond the M.B.A. core business analytics module by choosing 9 credit hours from the following list of courses. Other courses may be substituted for those in the list below, but must be approved by the M.B.A. Program Director prior to enrollment.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 411</td>
<td>Economic Forecasting</td>
<td>3</td>
</tr>
<tr>
<td>ECON 510</td>
<td>Time Series Methods &amp; Applications</td>
<td>3</td>
</tr>
<tr>
<td>ECON 534</td>
<td>Further Topics in Econometrics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 545</td>
<td>Quantitative Methods for Impact Evaluation &amp; Causal Inference</td>
<td>3</td>
</tr>
</tbody>
</table>

ISBC 330 Database Management 3
ISBC 430 Database Analytics 3
EFR 513 Large Dataset Management and Analysis 3
EFR 530 Learning Analytics 3
EFR 535 Data Analytics and Visualization with R 3

Government and Business Concentration

Students can choose to focus on government and business by choosing 9 credit hours from the following list of courses. No more than 3 credit hours total can be completed from POLS 580 and BADM 597. Other courses may be substituted for those in the list below, but must be approved by the M.B.A. Program Director prior to enrollment.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>POLS 502</td>
<td>Problems in State and Local Governments</td>
<td>3</td>
</tr>
<tr>
<td>ECON 503</td>
<td>Government and Business</td>
<td>3</td>
</tr>
<tr>
<td>POLS 531</td>
<td>Foundations of Public Administration</td>
<td>3</td>
</tr>
<tr>
<td>POLS 532</td>
<td>Public Policy</td>
<td>3</td>
</tr>
<tr>
<td>POLS 533</td>
<td>Administrative Ethics in the Public Sector</td>
<td>3</td>
</tr>
<tr>
<td>POLS 535</td>
<td>Public Organizations</td>
<td>3</td>
</tr>
<tr>
<td>POLS 537</td>
<td>Program Evaluation</td>
<td>3</td>
</tr>
<tr>
<td>POLS 538</td>
<td>Public Budgeting and Financial Administration</td>
<td>3</td>
</tr>
<tr>
<td>POLS 580</td>
<td>Administrative Internship</td>
<td>1-3</td>
</tr>
<tr>
<td>BADM 597</td>
<td>Graduate Cooperative Education</td>
<td>1-3</td>
</tr>
</tbody>
</table>

Social Entrepreneurship Concentration

Students can choose to focus on social entrepreneurship by successfully completing the three courses in the following list. Other courses may be substituted for those in the list below, but must be approved by the M.B.A. Program Director prior to enrollment.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>POLS 561</td>
<td>Creation and Management of Social Enterprises</td>
<td>3</td>
</tr>
<tr>
<td>POLS 562</td>
<td>Political Advocacy and Social Entrepreneurship</td>
<td>3</td>
</tr>
<tr>
<td>ENTR 580</td>
<td>Seminar in Social Entrepreneurship</td>
<td>3</td>
</tr>
</tbody>
</table>

International Concentration

The International Business concentration requires students to study abroad at a foreign college/university that has a formal course transfer agreement in place with UND. Students will complete the first and last semesters of their program of study at UND. Courses to be taken at the foreign college/university, and included in the program of study, must be approved by the M.B.A. Director prior to registration. Students are expected to take a workshop or course of study in cultural language studies from the foreign college/university.

Aviation Management Concentration

Students can choose to focus on aviation management by choosing 9 credit hours from the following list of courses. Other courses may be substituted for those in the list below, but must be approved by the M.B.A. Program Director prior to enrollment.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>AVIT 502</td>
<td>Aviation Economics</td>
<td>3</td>
</tr>
<tr>
<td>AVIT 510</td>
<td>Aviation Public Policy and Regulations</td>
<td>3</td>
</tr>
</tbody>
</table>

AVIT 512 Environmental Sustainability, Occupational Safety, and Health in Aviation 3
AVIT 513 Aviation Safety Management Systems 3
AVIT 514 Aviation Management Theory 3
AVIT 517 Airline Labor Relations and Law 3
AVIT 521 Ethics in Aerospace 3
AVIT 522 UAS Management 3
AVIT 523 Aviation Safety Data Analysis 3
AVIT 524 Air Traffic Management 3

Students who already have completed courses similar to those in the M.B.A. curriculum may be required to choose substitutes from the graduate credit offerings listed in this catalog. Substitutions require the prior approval of the M.B.A. Program Director and the Graduate Dean.

Final Examinations. The requirement of the final examinations for the M.B.A. degree is satisfied by the successful completion of MGMT 585 Advanced Strategic Management.

Master of Business Administration/Juris Doctor Combined Program

Admission Requirements

1. Students are required to apply to both the Law School and the School of Graduate Studies. Admission recommendations will be made to the School of Graduate Studies by the Director of the M.B.A. Program and approved by the Graduate Dean. The Law School Admissions Committee will determine admission into the Law School.
2. Students are expected to fulfill the minimum competence requirements prior to beginning M.B.A. course work.
3. Students pursuing a J.D. degree and wishing to add the M.B.A. degree must do so no later than the third semester of the J.D. program.
4. Admission requirements of each program will remain the same in the joint admission process as what is currently required to be admitted into each program separately.

Degree Requirements

If each degree were earned separately, a student would be required to complete 90 credit hours for the J.D. degree and 43 hours for the M.B.A. The joint degree program will enable a student to receive the two degrees upon completion of 81 law credit hours and 34 M.B.A. credit hours. The School of Law thus accepts 9 credit hours of J.D. courses toward the M.B.A. degree. The total credits required for each degree will be unchanged, because each program will accept credits toward the other degree.

In addition to the required courses for all students earning the J.D. degree, students enrolled in the joint degree program must successfully complete the following School of Law courses: Business Associations, and at least two Commercial Law courses. Other School of Law courses may be chosen to fulfill elective requirements.

Sample Curricular Plan (degree completion in four years)

The first year of the joint degree program will consist of the required curriculum in the School of Law. The third semester of the joint degree program will usually consist of law school courses, with M.B.A. Curriculum courses beginning in the fourth semester. To promote the integration of the two courses of study, courses after the third semester usually will be taken in each of the schools concurrently, rather than having the student located exclusively in one school or the other for an entire semester. Note: This timetable assumes that all undergraduate prerequisite courses have been completed prior to entering the joint program.
Semester 1 (Fall only)
Required first year curriculum in the School of Law 16
Semester 2 (Spring only)
Required first year curriculum in the School of Law 16
Semester 3
Courses in the School of Law 15
Semester 4
3 M.B.A. courses 7
Courses in the School of Law 6
Semester 5
3 M.B.A. courses 9
Courses in the School of Law 6
Semester 6
Courses in the School of Law 6
2 M.B.A. courses 6
Semester 7
Courses in the School of Law 7
2 M.B.A. courses 6
Semester 8
Courses in the School of Law 9
2 M.B.A. courses 6
Total Credits 115

Normally, the joint program will be completed in only four years. With summer school classes it may be possible to obtain both degrees even more quickly. All degree requirements in the Law School must be completed within 84 months of starting the program. Both degrees will be awarded simultaneously after all degree requirements are met in both programs.

Chemistry

M.S. in Chemistry (p. 358)
B.S./M.S. Combined Degree in Chemistry (p. 357)
Ph.D. in Chemistry (p. 358)

Courses
CHEM 508. Departmental Lecture. 1 Credit.
S/U grading.

CHEM 509. Graduate Seminar. 1 Credit.
Student presentation of a seminar based on current peer-reviewed literature.

CHEM 510. Intermediate Inorganic Chemistry. 3 Credits.
Review of atomic concepts, molecular topologies, and symmetry. Theories of bonding including directed and undirected atomic orbital view. An introduction to the chemistry of transition metals. Prerequisite: CHEM 454 or an equivalent approved by the department.

CHEM 511. Advanced Inorganic Chemistry. 3 Credits.
Structure of coordination compounds, mechanisms of inorganic reactions, biochemical applications of inorganic chemistry. Three hours lecture per week. Prerequisite: CHEM 510.

CHEM 512. Organometallic Chemistry. 3 Credits.
Preparation, bonding and reactivity of organometallic compounds, both main group and transition metal. Prerequisite: CHEM 454.

CHEM 519. Special Topics in Inorganic Chemistry. 1-3 Credits.
Topic of current interest to be considered each semester; may be repeated for credit if topic is different. Prerequisite: CHEM 510. Repeatable.

CHEM 520. Advanced Organic Chemistry I. 3 Credits.
Reaction mechanisms. Carbanions and radicals. Substitution, elimination and addition reactions. Carbonyl chemistry. Three hours lecture per week. Prerequisite: CHEM 352 or an equivalent approved by the department.

CHEM 521. Advanced Organic Chemistry II. 3 Credits.
Carbocations and carbenes. Oxidations and reductions. Alkylation. Carbonyl addition. Substitution and addition reactions. Three hours lecture per week. Prerequisite: CHEM 352 or an equivalent approved by the department.

CHEM 522. Advanced Organic Chemistry III. 3 Credits.
Photochemistry. Concerted reactions and cycloadditions. Aromatic and heterocyclic chemistry. Transition metal in organic chemistry. Three hours lecture per week. Prerequisite: CHEM 520 or CHEM 521.

CHEM 529. Special Topics in Organic Chemistry. 1-3 Credits.
Topic of current interest. May be repeated for credit if topic is different. Prerequisite: CHEM 520 or CHEM 521. Repeatable.

CHEM 530. Chemical Thermodynamics. 3 Credits.
Application of classical and statistical thermodynamics to chemical equilibrium, phase equilibrium and the physical properties of solutions. Three hours lecture. Prerequisite: CHEM 465 or an equivalent approved by the department.

CHEM 531. Chemical Dynamics. 3 Credits.
Study of the kinetics of complex, coupled chemical reactions in gas and solution phases; dynamics of gas phase reactions. Three hours lecture. Prerequisite: CHEM 465 or equivalent or consent of instructor.

CHEM 532. Quantum Mechanics in Chemistry. 3 Credits.
Application of the time-dependent Schroedinger equation to rotational, vibrational and magnetic spectroscopy; selection rules. Relation of molecular structural parameters and spectroscopic measurements; principles of group theory. 3 hours lecture. Prerequisite: CHEM 464 or an equivalent approved by the department.

CHEM 534. Quantum and Computational Chemistry. 3 Credits.
Study of the electronic structure of atoms and molecules using modern approximation methods; formal aspects of various perturbation and variational techniques as applied to chemical problems. 3 hours lecture. Prerequisite: CHEM 532.

CHEM 537. Graduate Cooperative Education. 1-9 Credits.
Practical experience of applying advanced concepts in chemistry. Experience will vary from student to student and must be coordinated with co-op host; Prerequisites: Permission of Department Chair is required, MS students must have minimum of 26 credits and PhD students must have a minimum of 52 credits. On demand.

CHEM 539. Special Topics in Physical Chemistry. 1-3 Credits.
Topic of current interest. May be repeated for credit if topic is different. Prerequisite: Consent of department. Repeatable.

CHEM 541. Analytical Spectroscopy. 3 Credits.
Fundamentals of analytical spectroscopy including principles of emission spectroscopy, flame photometry, atomic absorption and Raman spectroscopy, ultraviolet/visible spectroscopy, and fluorescence. 3 hours lecture. Prerequisite: CHEM 461 or an equivalent approved by the department.

CHEM 542. Electrochemical Methods. 3 Credits.
Topics ranging from the fundamentals of electrochemistry (including thermodynamics, kinetics, and mass transfer) to applications of contemporary electroanalytical techniques such as cyclic voltammetry, digital simulation, and spectroelectrochemistry are discussed. Three hours lecture. Prerequisite: CHEM 461 or an equivalent approved by the department.

CHEM 543. Chromatography. 3 Credits.
Fundamentals of modern chromatographic techniques including principles of band broadening, gas chromatography, liquid chromatography, and representative sampling problems. Three hours lecture. Prerequisite: CHEM 461 or an equivalent approved by the department.

CHEM 549. Special Topics in Analytical Chemistry. 1-3 Credits.
Topic of current interest to be considered each semester; may be repeated for credit if topic is different. Prerequisite: CHEM 540. Repeatable.

CHEM 561A. Foundations of Chemistry for Teacher Development. 3 Credits.
Second of a chemistry course sequence intended for: a) teachers planning to qualify to teach high school chemistry; or b) teachers looking to enrich their content knowledge in chemistry for professional development. Topics include elementary principles and theories of chemistry, matter, measurement, atoms, ions, molecules, reactions, chemical calculations, thermochemistry, bonding, molecular geometry, periodicity, gases. May not be used in Ph.D. or Master’s programs.

CHEM 561B. Foundations of Chemistry for Teacher Development. 3 Credits.
Continuation of CHEM 561A. Prerequisite: CHEM 561A. On demand.
CHEM 561L. Introduction to Guided Learning in Chemistry. 2 Credits.
First of a chemistry course sequence intended for: a) teachers planning to qualify to teach high school chemistry; or b) teachers looking to enrich their content knowledge in chemistry for professional development. Topics include: chemical nomenclature and structure; periodicity; aqueous reactions; chemical stoichiometry; ionic and covalent bonding; solutions; thermochemistry; gases, liquids and solids; and pedagogical issues. May not be used in Ph.D. or Master’s programs.

CHEM 562A. Intermediate Chemistry for Teacher Development. 3 Credits.
Fourth of a chemistry course sequence intended for: a) teachers planning to qualify to teach high school chemistry; or b) teachers looking to enrich their content knowledge in chemistry for professional development. Topics include: Equilibrium and kinetic principles of chemistry; behavior of solutions; rates of reactions; thermodynamics; aqueous equilibria (acid/base, solubility); electrochemical cells; chemical behavior of main-group elements; nuclear chemistry. May not be used in Ph.D. or Master’s programs. Prerequisite: CHEM 562L.

CHEM 562B. Intermediate Chemistry for Teacher Development. 3 Credits.
Continuation of CHEM 562A. Prerequisite: CHEM 562A.

CHEM 562L. Intermediate Guided Inquiry Learning in Chemistry. 2 Credits.
Third of a chemistry course sequence intended for: a) teachers planning to qualify to teach high school chemistry; or b) teachers looking to enrich their content knowledge in chemistry for professional development. Topics include: colligative properties; chemical kinetics and equilibrium; acid/base chemistry; thermodynamics; electrochemistry; and pedagogical issues. May not be used in Ph.D. or Master’s programs. Prerequisites: CHEM 561L and CHEM 561B.

CHEM 563A. Organic and Biochemistry for Teacher Development. 3 Credits.
Sixth of a chemistry course sequence intended for: a) teachers planning to qualify to teach high school chemistry; or b) teachers looking to enrich their content knowledge in chemistry for professional development. Topics include: hydrocarbons; alcohols; amines; aldehydes and ketones; carboxylic acids and their derivatives; proteins; carbohydrates, lipids; nucleic acids, enzymes; generation of biochemical energy; and pedagogical issues. May not be used in Ph.D. or Master’s programs. Prerequisite: CHEM 563L.

CHEM 563B. Organic and Biochemistry for Teacher Development. 3 Credits.
Continuation of CHEM 563A. Prerequisite: CHEM 563A.

CHEM 563L. Guided Inquiry Learning in Organic and Biochemistry. 2 Credits.
Fifth of a chemistry course sequence intended for: a) teachers planning to qualify to teach high school chemistry; or b) teachers looking to enrich their content knowledge in chemistry for professional development. Topics include: hydrocarbons; alcohols; amines; aldehydes and ketones; carboxylic acids and their derivatives; proteins; carbohydrates, lipids; nucleic acids, enzymes; and pedagogical issues. May not be used in Ph.D. or Master’s programs. Prerequisites: CHEM 562L and CHEM 562B.

CHEM 599. Research. 1-15 Credits.
Maximum of 15 credits each semester. May be repeated for credit. Repeatable.

CHEM 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

CHEM 997. Independent Study. 1-3 Credits.
Independent study supervised by graduate faculty. Repeatable to 3 credits. F.S.S.

CHEM 998. Thesis. 1-9 Credits.
Repeatable to 9 credits.

CHEM 999. Dissertation. 1-18 Credits.
Repeatable to 18 credits.

Undergraduate Courses for Graduate Credit

CHEM 471. Quantum Mechanics & Spectroscopy. 3 Credits.
Theory and nature of bonding and structure, spectroscopy, and optics. Prerequisites: CHEM 466, MATH 265, and PHYS 252. S.

Bachelor of Science/Master of Science Combined Degree in Chemistry

Admission Requirements

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. One year general chemistry, one year organic chemistry. One semester analytical chemistry, and one semester physical chemistry are desired. Students with different background in Chemistry will be placed on the level appropriate to their BS degree and/or prior background.*

2. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

3. International applicants who have received their bachelor’s or master’s degree in the United States or English-speaking Canada are not required to submit the TOEFL or IELTS.

4. * Students with no prior BS degree will be admitted to School of Graduate Studies upon completion of 120 credits.

Degree Requirements

Students seeking the Bachelor of Science combined with the Master of Science (Non-Thesis Option) Degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Chemistry Department.

Non-Thesis Option (32 credits total):

1. Twelve (12) credits of graduate chemistry.

2. Eighteen (18) elective credits. + May include up to three undergraduate foundation courses, as Scholarly Tools.*

3. One (1) credit of CHEM 509 Graduate Seminar.

4. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution, subject to faculty evaluation on the case-by-case basis.

5. One (1) credit of CHEM 997 Independent Study. Preparation of a written independent study and oral presentation of results to the advisor and interested faculty are required for successful completion of this course.

6. A written Comprehensive Examination (usually an ACS Standardized Test determined by the Advisory Committee) will be taken while in residence. Students will be required to pass the exam.

7. Required Courses:
   a. One (1) CHEM 509 Graduate Seminar.
   b. One (1) credit of CHEM 997 Independent Study. Preparation of a written independent study and oral presentation of results to advisor and interested faculty are required for successful completion of this course.
   c. Eight (8) credit hours of coursework (except the required CHEM 509 and CHEM 997 above) may be replaced with the following Co-op track
   d. Co-op Track
      CHEM 537 Graduate Cooperative Education 8
   e. Twelve (12) credits of graduate chemistry. May include up to three 400-level courses from the list provided below.
   f. CHEM 441 Instrumental Analysis I - Spectroscopy 2
   f. CHEM 442 Instrumental Analysis II - Electrochemistry 2
   g. CHEM 443 Instrumental Analysis III - Chromatography/Mass Spectrometry 2
   h. CHEM 455 Spectroscopy and Structure 3
   i. CHEM 463 Advanced Synthesis Laboratory 3
   j. CHEM 470 Thermodynamics & Kinetics 3
   k. CHEM 471 Quantum Mechanics & Spectroscopy 3
Doctor of Philosophy in Chemistry

Admission Requirements

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. A baccalaureate degree with a major in chemistry.
2. Undergraduate credit in mathematics through integral calculus.
3. One year of physics.
4. Graduate Record Examination General test for all students. (Chemistry subject test also required for all applicants without a baccalaureate degree in Chemistry).
5. Students with a bachelor’s degree may be directly admitted into the Ph.D. program.
6. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

Degree Requirements

Students seeking the Doctor of Philosophy degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Chemistry Department.

The degree of Doctor of Philosophy with a major in chemistry is a research degree and is conferred only in recognition of high achievement in independent scientific research and scholarship.

A candidate for the Ph.D. degree with a major in chemistry must complete a research problem in one of the four fields of chemistry. The scope of the doctoral dissertation will be such as to require the equivalent of at least one full-time academic year of research. Some doctoral research will require a substantially longer time. This research is expected to make a significant contribution to the candidate’s chosen field of chemistry. When the major professor decides that the candidate has satisfactorily completed the research problem, the candidate, in accordance with the regulations of the University, is required to prepare a dissertation covering the research.

1. Completion of 90 semester credits beyond the baccalaureate degree
2. Maintenance of at least a 3.0 GPA for all classes completed as a graduate student.
3. Required Courses:
   a. Two (2) credits of CHEM 509 Graduate Seminar
   b. Nine (9) credits of 500-level courses from one of the three specific major sequences listed below:
   c. Analysis and Applications
      CHEM 541 Analytical Spectroscopy
      CHEM 542 Electrochemical Methods
      CHEM 543 Chromatography
   d. Three (3) credits of CHEM 997 Independent Study
   e. Scholarly Tools: Up to 9 credits of foundational classes, either from other Departments (subject to approval by the student’s advisory committee) or those listed below:
      CHEM 466 Fundamentals of Physical and Biophysical Chemistry
      CHEM 454 Inorganic Chemistry II
      CHEM 333 Analytical Chemistry
      CHEM 361 Problem Solving in Organic Chemistry I
      CHEM 362 Problem Solving in Organic Chemistry II
      CHEM 510 Intermediate Inorganic Chemistry
      CHEM 520 Advanced Organic Chemistry I
   f. Nine (9) credits of elective courses (at least six must be 500-level Chemistry courses; three of these nine must be taken in divisions other than the major). Some of these credits may be replaced by Scholarly Tools as described above if deemed appropriate.
   g. CHEM 599 Research 55-57 credits
   h. CHEM 999 Dissertation 10-12 credits

Master of Science in Chemistry

Thesis Option

Admission Requirements

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. A baccalaureate degree with a major in chemistry.
2. A cumulative Grade Point Average (GPA) of at least 2.75 for all undergraduate work or a GPA of at least 3.0 for the junior and senior years of undergrad work.
3. Undergraduate credit in mathematics through integral calculus.
4. One year of physics.
5. Graduate Record Examination General test for all students. (Chemistry subject test also required for all applicants without a baccalaureate degree in Chemistry.)
6. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

**Degree Requirements**

Students seeking the Master of Science (Thesis Option) Degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Chemistry Department.

**Thesis Option (32 credits total):**

1. A minimum of 32 semester credits in a major field, including the credits granted for the thesis and the research leading to the thesis.
2. At least one-half of the credits must be at or above the 500-level.
3. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.

4. **Required Courses:**
   a. CHEM 509 Graduate Seminar – 1 credit
   b. One (1) credit of Independent Studies, CHEM 997
   c. Minimum fourteen (14) combined Research and Thesis credits
   d. Six (6) credit hours from one of the three specific major sequences below:

   **Analysis and Applications**
   
   Select two of the following: 6
   - CHEM 541 Analytical Spectroscopy
   - CHEM 542 Electrochemical Methods
   - CHEM 543 Chromatography

   **Synthetic**
   
   Select two of the following: 3
   - CHEM 511 Advanced Inorganic Chemistry
   - CHEM 512 Organometallic Chemistry
   - CHEM 521 Advanced Organic Chemistry II
   - CHEM 522 Advanced Organic Chemistry III

   **Theory**
   
   Select two of the following: 6
   - CHEM 475 Materials Chemistry
   - CHEM 530 Chemical Thermodynamics or PHYS 542 Statistical Physics or CHEM 509 Advanced Chemical Engineering Thermodynamics
   - CHEM 531 Chemical Dynamics
   - CHEM 532 Quantum Mechanics in Chemistry or PHYS 533 Quantum Mechanics

   f. Six (6) credit hours of 500-level chemistry courses from two sequences other than the major. Foundational classes from other divisions may be included. Three (3) of these credits may be from other Departments.

   g. **Scholarly Tools:** Up to nine (9) credit hours of foundational classes listed below, some of them may be stipulated by the Department.

   - CHEM 466 Fundamentals of Physical and Biophysical Chemistry 4
   - CHEM 454 Inorganic Chemistry II 3
   - CHEM 333 Analytical Chemistry 3
   - CHEM 361 Problem Solving in Organic Chemistry I 1
   - CHEM 362 Problem Solving in Organic Chemistry II 1
   - CHEM 510 Intermediate Inorganic Chemistry 3
   - CHEM 520 Advanced Organic Chemistry I 3

   h. CHEM 599 Research 10-12 credits; some of these credits may be replaced by Scholarly Tools as described above if deemed appropriate as long as the minimum requirement is met.

   i. CHEM 998 Thesis 4-6 credits.

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**Clinical Translational Science**

M.S. in Clinical Translational Science (p. 361)

Ph.D. in Clinical Translational Science (p. 360)

**Courses**

**PATH 500. Biochemistry and Cell Biology. 6 Credits.**

Knowledge in biochemistry and cell biology form the core concepts that underlay all study and research endeavors in the clinical sciences. Since the basics in these two disciplines are paramount to a successful graduate studies program, the course is designed to emphasize proficiency in basic concepts. The course is highly didactic and makes no assumptions of previous educational experiences of the incoming graduate student. This is deemed essential for a course that forms the stem in a multi-disciplinary graduate program. Thus the course is focused on basic textbook-based foundational knowledge and problem solving skills. The course begins by relating basic general and organic chemistry to biochemical systems, followed by addressing actual biochemical, synthetic and degradation reactions, and expanding this to the macromolecular and cell biological components of the process. Thus the study is first presented with the biochemical and molecular aspects of cellular processes and then uses this to build a more comprehensive picture of how molecular structures come together to forms structures visible by various forms of microscopy.

**PATH 505. Seminar in Clinical and Translational Science. 1 Credit.**

All students and faculty within the program will participate in longitudinal seminars discussing their research area and interrelationships with complimentary disciplines. This may be in form of discussions, “chalk talks,” or current efforts, literature or topic review. This will give students and faculty interdisciplinary and collaborative exposure to broad areas of inquiry and foster creativity and collaboration. This course will be taken annually by all students in the CTS program. Repeatable to 11 credits. S/U grading. F,S.

**PATH 575. Molecular and Pathological Basis of Human Disease. 4 Credits.**

Pathogenesis of Human Disease is an advanced graduate course that is based on lectures and discussions with a strong element of self-study through the use of extensive reading materials as well as lecture videos. This course is intended to cover aspects of the fundamental molecular, cellular and pathological mechanisms underlying various human diseases while the courses offered in the various CTS 590 special topics course will focus on diseases of specific organ systems. By the end of this course the student will have demonstrated a significant knowledge base of the molecular and pathological basis of human disease that is applicable to clinical and translational research. The student will also have sufficient knowledge of pathology to be capable of teaching this material to medical, professional, and graduate students. This course is open to all graduate students in the School of Medicine and Health Sciences as well as graduate students in biological sciences enrolled at the University of North Dakota who meet the prerequisites. Prerequisites: MBIO 509, PATH 500, and ANAT 517.

**PATH 590. Readings. 1-3 Credits.**

The primary goal of this course is for students to learn critical thinking and data analysis of the literature in their field of research study. Course sections will range from general training to journal clubs with an advanced topic focus. 1-3 credits There are two modes of this course 1) CTS 590 Readings: Scientific Reading This course is designed to promote critical reading of the literature. The primary goal is to teach students the process by which scientists identify problems, formulate testable hypotheses, collect data through experiments, and eventually establish new models describing biological processes. 1 credit 2) CTS 590 Readings: Journal Club The goal of the journal club is to familiarize students with the most up-to-date scientific literature and to develop the tools necessary to be a life-long learner. Students led by a faculty facilitator will discuss experimental methods and observations and this will provide graduate students the opportunity to develop oral skills. The course will also facilitate scientific communication between various clinical disciplines. The prerequisite for this course is CTS 590 Readings: Scientific Reading; or equivalent with permission from course director. Repeatable to 3 credits. S/U grading. F,S.

**PATH 591. Special Topics. 1-4 Credits.**

The course sections offered under Special Topics are designed to bring a wide range of advanced topic learning to students within the Clinical and Translational Science Program and are where the sub-program specialization courses will be focused. Most of these topics are advanced focus areas of pathology such as in breast or urologic disease, advanced topics in toxicology such as metals, or topics in bioinformatics such as human population genetics. Scientific writing is another special topic that is germane to all in the CTS program. Topic areas were advertised the semester previous to being offered. Prerequisite: PATH 500 and PATH 575. Repeatable to 8 credits. F,S.
PATH 593. Research. 1-6 Credits.
Research experience is offered in the specialty fields of the faculty within the Clinical and Translational Science Program and involves an intensive research experience on a variety of unique research problems utilizing modern methods and tools. Credits arranged (generally 1-6 credits per semester). Repeatable. F,S,SS.

PATH 996. Continuing Enrollment. 1-12 Credits.
This course is designed to allow the student to continue working on their thesis or dissertation when all the Research Credits have been used up. Repeatable to 12 credits. S/U grading. F,S,SS.

PATH 998. Thesis. 1-9 Credits.
The course is to enable the student time to complete the thesis or dissertation in the event that student has already used up all the required courses to the maximum extent before graduating. Repeatable to 9 credits. S/U grading. F,S,SS.

PATH 999. Dissertation. 1-15 Credits.
This required course is taken in the students last semester(s) as they prepare their doctoral dissertation. Progress will be overseen by the student’s faculty advisor in the Clinical and Translational Program. Repeatable to 15 credits. F,S,SS.

Doctor of Philosophy in Clinical Translational Science

Admission Requirements
The application process occurs through the School of Graduate Studies. Information is available from the UND School of Graduate Studies website (http://www.und.edu/dept/grad) (http://graduateschool.und.edu/).

If further advice or help would be beneficial to an applicant’s decision-making process, we encourage her or him to contact our Director of Graduate Education.

1. Completion of a four-year degree from an accredited university. We are particularly interested in students who have completed an undergraduate degree within the state of North Dakota.
2. Coursework: Admission into the graduate program offered through our department is dependent upon the applicant’s demonstration of effective academic skills and appropriate undergraduate training.

Generally, the applicant will have completed successfully the following coursework:

• General Biology or Zoology (one year sequence)
• General Chemistry (one year sequence)
• Organic Chemistry
• College Algebra

Coursework in Physics, Molecular Biology, or Genetics is strongly recommended.

Preference for admission may be given to applicants who have completed coursework in at least one of the following areas: Biology, Cell Biology, Chemistry, Biochemistry, or Medical Laboratory Sciences.

Applicants must have a cumulative undergraduate GPA of at least 2.75 and a cumulative GPA of 3.00 in graduate level course work, if applicable. Since the Graduate School requires a 3.0 for admission, those individuals with GPA less than 3.0 would have to be admitted under provisionary status.

1. Graduate Record Examination Scores: Applicants must submit Graduate Record Examination (General Test) scores. Preference for admission will be given to applicants whose test scores fall at or above the reported national averages or 50th percentiles.
2. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.
3. Admission to the Clinical and Translational Science Graduate Program can be made either through the MS degree program or by application directly to the PhD degree program. A MS degree is not required for admission into the PhD degree program.

4. Students who elect to begin the MS degree program and later decide they wish to pursue the PhD degree may choose to attempt to bypass the MS degree by taking the comprehensive examination. By passing it and meeting the other requirements, such as a GPA of 3.0 or higher in graduate level coursework, a student may be admitted to the PhD program without completing the MS program. Otherwise, a student admitted to the MS program must complete the degree as listed.

Degree Requirements
The graduation requirements for the Ph.D. degree in the Clinical and Translational Sciences Program consist of required and elective coursework and research leading to the preparation of a dissertation and scholarly tools.

1. Minimum of 90 semester hours of graduate credit.
2. Completion of the following graduate level courses (90 credits):

Foundation Coursework to be completed by all CTS graduate students:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIMD 510</td>
<td>Basic Biomedical Statistics</td>
<td>2</td>
</tr>
<tr>
<td>BIMD 516</td>
<td>Responsible Conduct of Research</td>
<td>2</td>
</tr>
<tr>
<td>PATH 500</td>
<td>Biochemistry and Cell Biology</td>
<td>6</td>
</tr>
<tr>
<td>PATH 505</td>
<td>Seminar in Clinical and Translational Science</td>
<td>1</td>
</tr>
<tr>
<td>PATH 590</td>
<td>Readings</td>
<td>1-3</td>
</tr>
<tr>
<td>PATH 591</td>
<td>Special Topics</td>
<td>1-4</td>
</tr>
<tr>
<td>PATH 593</td>
<td>Research</td>
<td>1-6</td>
</tr>
<tr>
<td>PATH 999</td>
<td>Dissertation</td>
<td>1-15</td>
</tr>
</tbody>
</table>

For the Pathogenesis of Human Disease Specilization, the following are required core courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mbio 509</td>
<td>Immunology</td>
<td>3</td>
</tr>
<tr>
<td>Anat 517</td>
<td>Biostatistics 1</td>
<td>3</td>
</tr>
<tr>
<td>PATH 575</td>
<td>Molecular and Pathological Basis of Human Disease</td>
<td>4</td>
</tr>
<tr>
<td>PATH 591</td>
<td>Special Topics</td>
<td>1-4</td>
</tr>
</tbody>
</table>

Students in the Pathogenesis of Human Disease Specilization are required to take a minimum of 4 hours of elective courses:

Examples:

• Breast Disease, 1 cr
• Urinary Disease, 1 cr
• Human Population Genetics, 2 cr
• Metals, 2 cr
• Other available, 1-4 cr

For the Bioinformatics and Human Population Genetics Specialization, the following are required core courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPH 531</td>
<td>Biostatistics 1</td>
<td>3</td>
</tr>
<tr>
<td>MPH 532</td>
<td>Biostatistics 2</td>
<td>3</td>
</tr>
<tr>
<td>MPH 534</td>
<td>Bioinformatics</td>
<td>3</td>
</tr>
<tr>
<td>MPH 535</td>
<td>Health Care Data Mining</td>
<td>3</td>
</tr>
</tbody>
</table>

* MPH 531 Biostatistics 1 can be substitute for the required foundational course BIMD 510 Basic Biomedical Statistics.

Students in the Bioinformatics and Human Population Genetics Specialization are required to take a minimum of 5 hours of elective courses from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PATH 591</td>
<td>Special Topics</td>
<td>1-4</td>
</tr>
<tr>
<td>MPH 533</td>
<td>Advanced Biostatistics</td>
<td>3</td>
</tr>
<tr>
<td>PATH 590</td>
<td>Readings</td>
<td>1-3</td>
</tr>
<tr>
<td>PATH 591</td>
<td>Special Topics</td>
<td>1-4</td>
</tr>
</tbody>
</table>

1. Other graduate level courses may be selected or substituted if approved by the graduate student’s Faculty Advisory Committee. Elective courses chosen should be appropriate to the student’s area of interest.
2. Scholarly Tools: All candidates for the PhD degree must demonstrate competence in the scholarly tools for study and research in the Clinical and Translational Science Graduate Program. Each department at UND is responsible for setting up its own “Scholarly Tool” requirements. These requirements must be completed before the student is permitted to take the comprehensive examination or becomes a candidate for the PhD degree. For the CTS program BIMD 510 Basic Biomedical Statistics meets the scholarly tool requirement.

3. Research and Dissertation: The PhD degree in Clinical and Translational Sciences requires completion of a dissertation based on the results of a research project completed by the graduate student under the guidance of a faculty advisor. The project must represent an original and independent investigation by the student. It is expected that the results of the research will be published in a refereed scientific journal before graduation or at least accepted for publication. The candidate must make a significant contribution to the advancement of knowledge in the field. The dissertation prepared by the candidate must be presented and defended before the Advisory Committee and the Clinical and Translational Sciences Graduate Faculty.

Master of Science in Clinical Translational Science

Admission Requirements

The application process occurs through the School of Graduate Studies. Information is available from the UND School of Graduate Studies website (http://www.und.edu/dept/grad) (http://graduateschool.und.edu/).

If further advice or help would be beneficial to an applicant's decision-making process, we encourage her or him to contact our Director of Graduate Education.

1. Completion of a four-year degree from an accredited university. We are particularly interested in students who have completed an undergraduate degree within the state of North Dakota.

2. Coursework: Admission into the graduate program offered through our department is dependent upon the applicant's demonstration of effective academic skills and appropriate undergraduate training.

Generally, the applicant will have completed successfully the following coursework:

- General Biology or Zoology (one year sequence)
- General Chemistry (one year sequence)
- Organic Chemistry
- College Algebra

Coursework in Physics, Molecular Biology, or Genetics is strongly recommended.

Preference for admission may be given to applicants who have completed coursework in at least one of the following areas: Biology, Cell Biology, Chemistry, Biochemistry, or Medical Laboratory Sciences.

Applicants must have a cumulative undergraduate GPA of at least 2.75 and a cumulative GPA of 3.00 in graduate level course work, if applicable. Since the Graduate School requires a 3.0 for admission, those individuals with GPA less than 3.0 would have to be admitted under provisional status.

1. Graduate Record Examination Scores: Applicants must submit Graduate Record Examination (General Test) scores. Preference for admission will be given to applicants whose test scores fall at or above the reported national averages or 50th percentiles.

2. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

3. Admission to the Clinical and Translational Science Graduate Program can be made either through the MS degree program or by application directly to the PhD degree program. A MS degree is not required for admission into the PhD degree program.

4. Students who elect to begin the MS degree program and later decide they wish to pursue the PhD degree may choose to attempt to bypass the MS degree by taking the comprehensive examination. By passing it and meeting the other requirements, such as a GPA of 3.0 or higher in graduate level coursework, a student may be admitted to the PhD program without completing the MS program. Otherwise, a student admitted to the MS program must complete the degree as listed.

Degree Requirements

Students seeking the Master of Science degree through the Clinical and Translational Science Graduate program at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the program.

1. Minimum of 30 semester hours of graduate credit.

2. Completion of the following graduate level courses (minimum 30 credits):

   Foundational Coursework to be completed by all CTS graduate students:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIMD 510</td>
<td>Basic Biomedical Statistics</td>
<td>2</td>
</tr>
<tr>
<td>BIMD 516</td>
<td>Responsible Conduct of Research</td>
<td>2</td>
</tr>
<tr>
<td>PATH 500</td>
<td>Biochemistry and Cell Biology</td>
<td>6</td>
</tr>
<tr>
<td>PATH 505</td>
<td>Seminar in Clinical and Translational Science</td>
<td>1</td>
</tr>
<tr>
<td>PATH 590</td>
<td>Readings</td>
<td>1-3</td>
</tr>
<tr>
<td>PATH 593</td>
<td>Research</td>
<td>1-6</td>
</tr>
<tr>
<td>PATH 998</td>
<td>Thesis</td>
<td>1-9</td>
</tr>
</tbody>
</table>

   A minimum of 4 credits of elective coursework is required for all MS in CTS students. Available elective coursework will vary based on track.

For students in the Pathogenesis of Human Disease track, a minimum of 4 hours of elective courses selected from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MBIO 509</td>
<td>Immunology</td>
<td>3</td>
</tr>
<tr>
<td>ANAT 517</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>PATH 590</td>
<td>Readings</td>
<td>1-3</td>
</tr>
<tr>
<td>PATH 591</td>
<td>Special Topics</td>
<td>1-4</td>
</tr>
<tr>
<td>PATH 591</td>
<td>Special Topics</td>
<td>1-4</td>
</tr>
</tbody>
</table>

For students in the Bioinformatics and Human Population Genetics track, a minimum of 4 hours of elective courses selected from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPH 532</td>
<td>Biostatistics 2</td>
<td>3</td>
</tr>
<tr>
<td>MPH 534</td>
<td>Bioinformatics</td>
<td>3</td>
</tr>
<tr>
<td>MPH 535</td>
<td>Health Care Data Mining</td>
<td>3</td>
</tr>
<tr>
<td>MPH 590</td>
<td>MPH Seminar in Leadership and Advocacy</td>
<td>1</td>
</tr>
<tr>
<td>PATH 591</td>
<td>Special Topics (Human Population Genetics)</td>
<td>2</td>
</tr>
<tr>
<td>PATH 591</td>
<td>Special Topics (Scientific Writing)</td>
<td>1</td>
</tr>
</tbody>
</table>

   * MPH 531 Biostatistics 1 must be completed as a pre-requisite for MPH 532 Biostatistics 2; MPH 531 Biostatistics 1 will not count toward the 4 hours of required elective coursework for this specialization, but can be substituted for the required foundational course BIMD 510 Basic Biomedical Statistics.

3. Other graduate level courses may be selected or substituted if approved by the graduate student’s Faculty Advisory Committee. Elective courses chosen should be appropriate to the student’s area of interest.


Communication

M.A. in Communication (p. 363)
Ph.D. in Communication (p. 362)

Courses

COMM 501. Theoretical Perspectives in Communication. 3 Credits. Course provides a conceptual and historical overview of Communication Studies, paying special attention to questions of epistemology. F.
COMM 505. Concepts in Quantitative Communication Research. 3 Credits.
In the two-part 505/506 course, students focus on honing their understanding of the quantitative/qualitative paradigm in Communication research. While this course section focuses on the various methods that fall under the labels of quantitative, both portions of the course seek to identify possible points of connection and resistance across the spectrum of methodological choices and require participation in Communication Program colloquium series. F, odd years.

COMM 506. Concepts in Qualitative Communication Research. 3 Credits.
In the two-part 505/506 course, students focus on honing their understanding of the quantitative/qualitative paradigm in Communication research. While this course section focuses on the various methods that fall under the labels of quantitative, both portions of the course seek to identify possible points of connection and resistance across the spectrum of methodological choices and require participation in Communication Program colloquium series. F, even years.

COMM 512. Communication Ethics, Law, and Regulation. 3 Credits.
Focuses on the ethical foundations of media law and communication public policy.

COMM 515. International and Intercultural Narrative Communication. 3 Credits.
This course examines narration or narrative communication within and between cultures and nations. Narration and communication theory and practice are explored for content and used as method. Assessing narrative communication in terms of international and intercultural comprehension and acceptance is addressed. On demand.

COMM 525. Interpersonal Relations and Communication. 3 Credits.
Face-to-face and mediated transactions between two people or people in small groups in diverse settings. Deals with inquiry, conflict management, interpersonal sensitivity, individuality, and conformity.

COMM 528. Intercultural Global Conflict. 3 Credits.
Communication patterns and processes can both facilitate conflict and terrorism as well as reduce discord and violence. Communication and conflict theory and research are examined in a global context with implications for terrorism, insurgency, and violence. Intergroup communication as well as communication strategies for mitigating discord and enhancing violence reduction are considered. On demand.

COMM 530. Gender, Culture, and Communication. 3 Credits.
An examination of how males and females from different cultural, ethnic and national backgrounds use, and are portrayed by, communication institutions and processes. Covers issues of representation, identity and difference.

COMM 533. Communication and International Development. 3 Credits.
This course introduces students to theoretical foundations of historical and contemporary issues in communication, media, information and international development. 21st century dynamic geopolitical processes are studied in relation to the issues of state-building, modernization, dependency, and globalization. On demand.

COMM 535. Intercultural Communication. 3 Credits.
This course incorporates critical conceptualizations of identity, “the Other”, and multiculturalism. It explores theoretical reflections of the symbolic systems of unfamiliar cultures, and the emergence of mutual understanding.

COMM 538. International Media. 3 Credits.
This course provides a comparison of media systems, media flows, and communication among countries. Both theoretical and ethnographic perspectives are considered by examining global media patterns and local flows through particular cultures around the world. The theoretical approaches of hybridism and post-colonialism are applied. On demand.

COMM 540. Communication and Organizations. 3 Credits.
Examines the general communication processes and dynamics within and among organizations and explores the dynamics in network organizations, with a particular focus on communication in interpersonal groups and inter-organizational working teams. Theories of power and politics in and among organizations, as well as of decision-making, conflict management, and strategic communication are explored.

COMM 543. International and Intercultural Indigenous Communication. 3 Credits.
This course examines communication within and between indigenous and non-indigenous people internationally, interculturally, and interlinguistically. Ramifications and conceptualizations related to comprehension and acceptance in communicating within and between indigenous people in international and intercultural settings is addressed. On demand.

COMM 549. Communication Technologies, Society, & Diversity. 3 Credits.
A critical study of theoretical components of the so-called “Information Society,” which addresses the interaction of communication technologies with individuals, communities, economies, and cultures. This course focuses on aspects of technological change, new patterns of global connectedness, and their implications for emerging global paradigms. On demand.

COMM 550. International and Global Communication. 3 Credits.
An analysis of international media, comparative telecommunications systems and globalization. Covers issues such as transnational communication, global journalism, satellite broadcasting and communication in diplomacy and international affairs.

COMM 570. Seminar in Communication. 3 Credits.
In-depth studies in specific communication areas such as relational communication, rhetoric and public discourse, intercultural/international communication. May be repeated for credit with change of topic (up to 15 hours). Repeatable to 15 credits.

COMM 591. Individual Readings and Research. 3 Credits.
Directed readings and research in speech communication and mass communication topics and issues. May be repeated to a total of 12 credits. 3 credit limit per semester. Repeatable to 12 credits.

COMM 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

COMM 997. Independent Study. 2 Credits.

COMM 998. Thesis. 1-4 Credits.
4 credits required for thesis option. Repeatable to 9 credits.

COMM 999. Dissertation. 1-15 Credits.
Repeatable to a maximum of 15 credits. Repeatable to 15 credits.

Undergraduate Courses for Graduate Credit

COMM 310. Media and Diversity. 3 Credits.
Study of minority status within mass media organizations and in media content from historical, contemporary and speculative points of view. F.

COMM 401. Organizational Communication. 3 Credits.
Analysis of communication behavior in formally structured relationships as it relates to the organization and to individuals. Special attention given to organizational style, status, trust and conflict-management. Informal communication networks and rumor are studied. S.

COMM 402. Intercultural/International Communication. 3 Credits.
This course will provide an overview of the study of intercultural and international communication. Topics addressed will include: history, literature, and culture of specific groups including racial, religious, and ethnic issues that affect communication patterns and outcomes. S.

COMM 404. Advertising and Society. 3 Credits.
Examines and evaluates the social, ethical and economic aspects of advertising. Attention is given to appraising the effects of advertising on the consumer and competition. F.

COMM 405. Social Implications of the Information Society. 3 Credits.
Considers and evaluates different perspectives on the information society, ranging from humanistic and Neomarxist critiques to the optimistic scenarios of some futurists. Examines the implications of new means of creating, storing, manipulating and disseminating information. Discussion of whether or not the potential benefits will be realized. S.

Doctor of Philosophy in Communication

Admission Requirements

Admission Requirements for consideration for the Doctor of Philosophy degree in the Communication Program include:
Master of Arts in Communication
Admission Requirements
The Communication Graduate Faculty will recommend admission based on the following applications materials.

Master of Arts in Communication:

1. A letter of application, including a statement of purpose answering the question of why one would be interested in advanced study of communication. This letter should also include an indication of a faculty member with whom applicant might work.
2. Acceptable performance on Graduate Record Examination General Test.
3. Completion of the equivalent of 20 undergraduate credits in speech communication and/or mass communication, journalism or related field, including at least 12 upper division credits.
4. Provide a transcript with a minimum 3.0 undergraduate Grade Point Average.
5. Three letters of recommendation.
6. To be considered for a teaching assistantship, the student must submit a statement of teaching philosophy.
7. Satisfy the School of Graduate Studies' English Language Proficiency requirements as published in the graduate catalog.
8. Optional materials, including writing or work samples.

Degree Requirements
Students seeking the Master of Art degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Communication Program.

Required core courses for all Communication Master’s students:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 501</td>
<td>Theoretical Perpectives in Communication</td>
<td>3</td>
</tr>
<tr>
<td>COMM 505</td>
<td>Concepts in Quantitative Communication Research</td>
<td>3</td>
</tr>
<tr>
<td>COMM 506</td>
<td>Concepts in Qualitative Communication Research</td>
<td>3</td>
</tr>
<tr>
<td>COMM 535</td>
<td>Intercultural Communication</td>
<td>3</td>
</tr>
<tr>
<td>COMM 550</td>
<td>International and Global Communication</td>
<td>3</td>
</tr>
</tbody>
</table>

Elective Requirements from COMM (minimum of 21 credits chosen from the list below)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 512</td>
<td>Communication Ethics, Law, and Regulation</td>
<td>3</td>
</tr>
<tr>
<td>COMM 515</td>
<td>International and Intercultural Narrative</td>
<td>3</td>
</tr>
<tr>
<td>COMM 525</td>
<td>Interpersonal Relations and Communication</td>
<td>3</td>
</tr>
<tr>
<td>COMM 528</td>
<td>Intercultural Global Conflict</td>
<td>3</td>
</tr>
<tr>
<td>COMM 530</td>
<td>Communication, Society, &amp; Diversity</td>
<td>3</td>
</tr>
<tr>
<td>COMM 533</td>
<td>Communication and International Development</td>
<td>3</td>
</tr>
<tr>
<td>COMM 538</td>
<td>International Media</td>
<td>3</td>
</tr>
<tr>
<td>COMM 540</td>
<td>Communication and Organizations</td>
<td>3</td>
</tr>
<tr>
<td>COMM 543</td>
<td>International and Intercultural Indigenous</td>
<td>3</td>
</tr>
<tr>
<td>COMM 549</td>
<td>Information Communication Technologies</td>
<td>3</td>
</tr>
<tr>
<td>COMM 570</td>
<td>Seminar in Communication</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Electives (minimum of 15 credits chosen from the list below)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 591</td>
<td>Individual Readings and Research</td>
<td>3</td>
</tr>
<tr>
<td>COMM 599</td>
<td>Seminar in Communication</td>
<td>3</td>
</tr>
</tbody>
</table>

Non-Thesis Option with Professional Portfolio
Students choosing the non-thesis option whose final project is a professional portfolio must meet the following requirements:

1. A minimum of 32 credits in communication are required if a minor or cognate is not chosen.
2. The coordinator of graduate studies appoints a four-person advisory committee comprised of three Graduate Faculty, normally drawn from the Communication Program and chaired by the student’s adviser.
3. Candidates will be expected to prepare a professional portfolio to be examined by their advisory committee.
4. Portfolio content must be approved by the student’s advisory committee, completed under the guidance of the student’s advisory committee, with...
a review of the completed professional portfolio to the satisfaction of the advisory committee.

A Minor or Cognate Option

1. If a minor or cognate is approved by a student’s faculty advisory committee, the student will be required to take the same amount of credits required for a major (30 credits for the thesis option or 32 credits for the non-thesis option with professional portfolio) with a minimum of 20 credits in communication and a minimum of 9 credits in a minor or cognate.

Communication Sciences and Disorders

M.S. in Communication Sciences and Disorders (p. 365)

Courses

CSD 501. Seminar in Speech-Language Pathology and Audiology. 1-3 Credits.
A study of the application of current and emerging data in the area of clinical assessment and management of speech disorders, language disorders, or disorders of hearing, in children and adults with communication impairments. May be repeated as topics change. Prerequisite: Consent of instructor. Repeatable.

CSD 525. Introduction to Research in Speech-Language Pathology and Audiology. 3 Credits.
Research methods in Speech-Language Pathology and Audiology. Steps in research before data analysis is undertaken. Culminates in a research proposal.

CSD 530. Audiology for SLPs. 1 Credit.
Diagnosis and management of auditory disorders. Prerequisites: CSD 431 and CSD 434. F, SS.

CSD 532. Neurogenic Communication Disorders I. 3 Credits.
Study of the representation or organization of language in the human brain as determined by multidisciplinary techniques such as neuroimaging, electrical stimulation mapping, etc. Includes aphasia and communication disturbance in adults following traumatic injury to the brain, and also clinical management. Prerequisites: CSD 231 and CSD 422.

CSD 533. Investigations in Child Language. 3 Credits.
Student formulation of questions and concerns about normal and disordered child language which are studied through a search of pertinent literature and through observation and analysis of children’s linguistic production. Prerequisites: CSD 343.

CSD 534. Advanced Speech Sound Disorders. 2 Credits.
Advanced knowledge of articulation and phonological disorders; skills needed to assess and treat individuals with these disorders. Emphasis on childhood apraxia, velopharyngeal disorders, cognitive disorders, hearing loss, tongue thrust, dialectal differences, dysarthrias in children, and phonemic disorders concurrent with language disorders. Prerequisites: CSD 333 or equivalent. SS.

CSD 536. Stuttering Intervention. 2 Credits.
A study of the theoretical bases for and the clinical management of stuttering in children and adults.

CSD 538. Management of Phonatory Disorders. 3 Credits.

CSD 542. Neurogenic Communication Disorders II. 3 Credits.
Assessment and intervention strategies for children with traumatic brain injury, cerebral palsy, fetal alcohol syndrome and developmental apraxia. Includes evaluation for and application of augmentative and alternative communication devices.

CSD 550. Motor Speech Disorders. 2 Credits.
The study of control and damage of speech production related to neurological diseases and lesions. Includes assessment and intervention strategies for adults with motor speech disorders such as dysarthria and apraxia of speech. Prerequisites: CSD 532 and CSD 542. SS.

CSD 551. Dysphagia. 2 Credits.
The study of normal and abnormal swallowing, swallowing disorders in children and adults including assessment and intervention strategies. Prerequisites: CSD 532 and CSD 542. F.

CSD 553. Swallowing Disorders. 2 Credits.
Prerequisites: CSD 422 and CSD 542; or equivalents.

CSD 572. Neurogenic Communication Disorders IV. 3 Credits.
A study of cognitive and communication deficits that accompany right hemisphere damage, as well as traumatic brain injury, their diagnosis and management. Prerequisites: CSD 422 and CSD 532.

CSD 580. Interprofessional Health Care. 1 Credit.
The purpose of the course is to learn to work effectively in an interdisciplinary health care team, using a shared patient-centered approach. Students work with other team members from physical therapy, nursing, occupational therapy, medicine, social work, clinical lab science, and dietetics. Case studies using problem-based learning techniques are the primary teaching strategy. S/U grading.

CSD 583. Evaluation and Service Delivery. 3 Credits.
The study of: 1) the underlying principles and philosophies of evaluation in speech-language pathology, including interviewing, administering and interpreting diagnostic tests and protocols, and client counseling; and 2) the concepts and principles of service delivery including creative problem solving, decision making, collaboration, and management of services.

CSD 584. Advanced Clinical Practicum. 1-16 Credits.
Provision of clinical services to individuals with communication disorders under the supervision of an ASHA certified supervisor. Placement will be the UND Speech-Language-Hearing Clinic or a departmentally-approved external site. Prerequisites: CSD 485 and consent of instructor. Repeatable.

CSD 585. Practicum in the School Setting. 1-16 Credits.
Supervised practicum in a University-approved cooperating school. Prerequisites: Graduate standing and consent of department. Repeatable to 16 credits. F,S.

CSD 586. Advanced Clinical Practicum: Audiology. 1-16 Credits.
The administration and interpretation of tests and procedures for evaluation of human auditory functioning; practice involving interviews, case histories and client counseling.

CSD 592. Research Design in Speech and Hearing Sciences. 3 Credits.
The use of speech science instrumentation and data collection and analysis in human speech, language and hearing. Prerequisites: CSD 541 and 543.

CSD 595. Research Problems in Speech-Language Pathology-Audiology. 1-3 Credits.
A. Speech-Language Pathology, B. Audiology. Prerequisite: Consent of instructor. Repeatable.

CSD 597. Special Problems in Communication Disorders. 1-3 Credits.
An examination of special topics in communication disorders. Prerequisite: Consent of instructor. Repeatable.

CSD 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

CSD 997. Independent Study. 2 Credits.
Repeatable to 9 credits.

CSD 998. Thesis. 1-9 Credits.
Repeatable to 18 credits.

CSD 999. Dissertation. 1-12 Credits.
Repeatable to 18 credits.

Undergraduate Courses for Graduate Credit

CSD 343. Language Development. 3-4 Credits.
The nature and development of linguistic content, form, and use from birth to adulthood are studied relative to the development of communication and speech; relative to cognitive, social, and physical development; and relative to cultural diversity. Prerequisites or Corequisites: ENGL 209, PSYC 250, and CSD 340; or equivalents. F.

CSD 431. Introduction to Audiology. 3 Credits.
Elementary structure and function of the hearing mechanism; basic psychophysical dimensions of the auditory mechanism; types of deficient hearing; pure tone threshold and screening audiometry. Students are required to do hearing testing to qualify for certification in speech and hearing. Prerequisites: CSD 231 and CSD 235, and MATH 103. F.
Master of Science in Communication Sciences and Disorders

Admission Requirements

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. Graduate Record Examination—General Test.
2. Overall undergraduate GPA of at least 2.75 and a 3.00 in the courses required for an undergraduate major in Communication Sciences Disorders.
3. Admittance to approved status typically requires an undergraduate major in Communication Sciences Disorders.
4. Those admitted to Qualified Status must have at least 12 semester credits of undergraduate work in the field, but will be required to complete the coursework for the undergraduate major.
5. Criteria used in admission decisions:
   a. Scores on the Graduate Record Examination General test;
   b. All grade point averages from previous undergraduate, post-baccalaureate and graduate studies;
   c. The extent and quality of previous clinical, research, and service activities; and
   d. Quality of speaking, writing, and interpersonal skills.
6. Applicants should include documentation of their qualifications relative to the criteria above.
7. Admissions for summer and fall enrollment and the award of financial aid will be based on applications completed by January 15.
8. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

Degree Requirements

Students seeking the Master of Science degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Communication Sciences and Disorders Department.

Thesis Option:

1. A minimum of 30 semester credits in a major field, including the credits granted for the thesis and the research leading to the thesis.
2. At least one-half of the credits must be at or above the 500-level.
3. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.
4. Required CSD Courses:
   a. CSD 525 Introduction to Research in Speech-Language Pathology and Audiology 3
   b. CSD 530 Audiology for SLPs 1
   c. CSD 532 Neurogenic Communication Disorders I 3
   d. CSD 533 Investigations in Child Language 3
   e. CSD 534 Advanced Speech Sound Disorders 2
   f. CSD 536 Stuttering Intervention 2
   g. CSD 538 Management of Phonatory Disorders 3
   h. CSD 542 Neurogenic Communication Disorders II 3
   i. CSD 550 Motor Speech Disorders 2
   j. CSD 551 Dysphagia 2
   k. CSD 556 Medical and Neurological Disorders 2
   l. CSD 557 Communicative Disorders of Hearing Impaired Individuals 2
   m. CSD 558 Advanced Synthesis 1
   n. CSD 559 Internship 2
   o. CSD 597 Special Problems in Communication Disorders 1-3
   p. PSYC 541 Advanced Univariate Statistics 3

Non-Thesis Option:

1. Thirty-two (32) credits including credits required for the major.
2. A minimum of two credits of Independent Study.
3. At least one-half of the credits must be at or above the 500-level.
4. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.
5. Preparation of a written independent study approved by the faculty advisor.
7. Required CSD Courses:
   a. CSD 525 Introduction to Research in Speech-Language Pathology and Audiology 3
   b. CSD 530 Audiology for SLPs 1
   c. CSD 532 Neurogenic Communication Disorders I 3
   d. CSD 533 Investigations in Child Language 3
   e. CSD 534 Advanced Speech Sound Disorders 2
   f. CSD 536 Stuttering Intervention 2
   g. CSD 538 Management of Phonatory Disorders 3
   h. CSD 542 Neurogenic Communication Disorders II 3
   i. CSD 550 Motor Speech Disorders 2
   j. CSD 551 Dysphagia 2
   k. CSD 583 Evaluation and Service Delivery 3
   l. CSD 584 Advanced Clinical Practicum 1-16
   m. CSD 572 Neurogenic Communication Disorders IV 3
   n. EFR 515 Methods and Materials 2
   o. PSYC 541 Advanced Univariate Statistics 3
   p. School Practicum CSD 585 Practicum in the School Setting 10
   q. Electives CSD 595 Research Problems in Speech-Language Pathology-Audiology 1-3
   r. CSD 597 Special Problems in Communication Disorders 1-3
   s. Thesis CSD 998 Thesis 4

Total Credits 51-70

Students wishing to qualify for employment in a school setting must complete requirements for a teaching credential as a graduate student. These include a Student Program in CSD, and . Students must also take the Praxis I Teacher Certification Examination.

Graduate Students already having a teaching credential with some other major must take T&L 400 Methods and Materials and practicum in a school before being recommended for employment in a school.

Computer Science

M.S. in Computer Science (p. 369)
M.S. in Data Science (p. 370)
Ph.D. in Scientific Computing (p. 367)

Courses

CSCI 500. Graduate Orientation. 1 Credit.
A discussion of various research and applied computing projects. Continued enrollment required of all graduate students until a research/project topic and an advisor are selected. S/U grading.

CSCI 501. Topics in Computer Science. 1-3 Credits.
Selected topics from current developments in Computer Science. Repeatable to 3 credits. Prerequisite: Permission of department. Repeatable to 3 credits.

CSCI 513. Advanced Database Systems. 3 Credits.
An advanced study of database system architecture, implementation, and applications, with emphasis on the object-oriented, object-relational, and embedded data models, and new database advancements including research and practical issues in database systems and data science. Prerequisite: CSCI 455.

CSCI 515. Data Engineering and Management. 3 Credits.
This course studies theoretical and applied research issues related to data engineering, management, and science. Topics will reflect state-of-the-art and state-of-the-practice activities in the field. The course focuses on well-defined theoretical results and empirical studies that have potential impact on data acquisition, analysis, indexing, management, mining, retrieval, and storage. Prerequisite: CSCI 513. S, even years.

CSCI 522. Theoretical Foundations of Computer Science. 3 Credits.
A selection of topics from theoretical computer science, possibly including formal languages, automata, other models of computation, and the theory of computability, decidability, and complexity. Prerequisite: CSCI 435.

CSCI 532. High Performance Computing and Paradigms. 3 Credits.
A study of current topics in threads, inter-process communication and synchronization, master-slave and peer designs for concurrency, client-server architectures, cluster/grid computing and massively parallel computer architectures. A considerable amount of programming will be done in one or more of these environments. F, odd years.

CSCI 537. Graduate Cooperative Education. 1-2 Credits.
A practical work experience in advanced computing, approved by the student's advisor. Requirements include a written report and an oral presentation upon completion of the work experience. Prerequisites: A minimum of 9 graduate credits in computer science and consent of the Department. S/U grading. On demand.

CSCI 543. Machine Learning. 3 Credits.
An introductory course in machine learning for data science. Topics include the learning algorithms of a Bayesian network, neural network, parametric/non-parametric methods, kernel machine, support-vector machine, etc. for regression, classification, clustering, dimensionality reduction, etc. Prerequisite: CSCI 365 or CSCI 384. F, odd years.

CSCI 544. Soft Computing: Computational Intelligence I. 3 Credits.
A study of the computational intelligence with the Soft Computing paradigm. The topics include the theory and computational methods of Fuzzy Logic and system, Neural Network, Evolutionary Algorithm and other topics, whose paradigms and hybrid techniques are widely applied to data science and mining, pattern classification and clustering, information retrieval, control engineering, decision making, and optimization problem, etc. S, even years.

CSCI 545. Discrete Dynamical Systems Modeling and Simulation. 3 Credits.
A study of various modeling methods applicable to large scale distributed and parallel systems. Topics include cellular automata, grid models, and chaos theory. Prerequisite: CSCI 445.

CSCI 546. Advanced Computer Graphics. 3 Credits.
An introduction to advanced topics in computer graphics. Included are light and color theory, image processing and compression, spatial-frequency transformations, raytracing, sampling theory, and topics of current interest. Prerequisites: CSCI 466 and MATH 265. S, even years.

CSCI 547. Scientific Visualization. 3 Credits.
A study of visualization techniques useful in the analysis of engineering and scientific data. Topics include the study of physical models; methods of computational science; two- and three-dimensional data types; visual representation schemes for scalar, vector, and sensor data; isosurface and volume visualization methods. The course will also cover image processing and pattern recognition, with topics, including Fourier transforms, fractal geometry, and neural networks. Prerequisite: CSCI 466. F, even years.

CSCI 551. Security for Cloud Computing. 3 Credits.
Cloud computing scheme aims to provide users with a shared computing infrastructure. The privacy and security concerns in cloud computing are different from the security concerns present in a dedicated data center. This course focuses on these security concerns and countermeasures for a cloud environment. This course provides an overview of cloud computing and virtualization, the critical technology underpinning cloud computing, and the major threats to the operations of cloud computing. Topics may include access control, identity management, denial of service, account and service hijacking, secure APIs, malware, forensics, regulatory compliance, trustworthy computing, and secure computing. Prerequisites: CSCI 370, CSCI 451; and one of the following: CSCI 327, CSCI 427 or CSCI 555. S, odd years.

CSCI 552. Cyber Physical Systems Security. 3 Credits.
This course provides an introduction to security issues relating to various cyber-physical systems including industrial control systems and those considered critical infrastructure systems. Topics include: Industrial cyber security history and threats, hacking industrial control systems, securing industrial control systems, advanced cyber-physical systems security concepts, and privacy in cyber-physical systems. F, even years.

CSCI 554. Applications in AI/Computational Intelligence. 3 Credits.
A continuous study of the computational paradigms of Soft Computing in the field of Computational Intelligence. The topics include the applications of the various soft computing techniques in Computational Intelligence as well as more evolutionary algorithms in Swarm Intelligence. Prerequisite: CSCI 544. F, even years.

CSCI 555. Computer Networks. 3 Credits.
A study of new and developing network architectures and communication protocols. Broadband technologies will be considered including BISDN, ATM networks, and other high-speed networks. Prerequisite: CSCI 327.

CSCI 562. Formal Specification Methods. 3 Credits.
A foundational course that introduces several formal specification techniques for construction and analysis of software artifacts. Included are rigorous program development, abstract specifications of modules, and modeling of concurrent and distributed software. Prerequisites: CSCI 435 and CSCI 463.

CSCI 565. Advanced Software Engineering. 3 Credits.
A study of current topics related to the design and implementation of large software systems. Course content may vary with instructor and student interest. Potential topics include: software testing and validation, programming environments, program metrics and complexity, design methodologies, software reliability and fault tolerance. Prerequisite: CSCI 463.

CSCI 566. Software Engineering Project. 3-6 Credits.
The complete development of a useful software product, including specifications, design, documentation, coding, testing and verification. Students may work in teams. The project is supervised by the students’ Independent Study Advisor. This course may not be used as an elective for the thesis option in computer science. Repeatable to 6 credits. Prerequisite: CSCI 463. Repeatable to 6 credits.

CSCI 575. Analysis of Algorithms. 3 Credits.
The time and space complexity of classical computer algorithms is analyzed. NP hard and NP complete problems are characterized and illustrated. Prerequisite: CSCI 435.

CSCI 582. Software Architecture. 3 Credits.
Software architecture is a fairly young sub-discipline within software engineering; it is aimed at shifting the designer's focus from algorithmic control structure to interactive interrelations among components. This course, among other things, will expose students to the concepts of design, design of design, principles and state-of-the-art methods and techniques in software architectures, which include the discussion of architectural patterns (or styles), domain specific architectural design, formal architectural description languages (ADLs), software connectors (simple and composite), architectural analysis, and middleware and component-based software development. Prerequisites: CSCI 463 and CSCI 435.
CSCI 588. Data Structure, Algorithms, and Software Design in C++. 3 Credits.
This course is intended for the Scientific Computing Ph.D students. The course attempts to introduce C++ via laboratory sessions. More specifically, this course tries to incorporate Data Structures and Algorithms in C++ as well as Software Design in C++. During these sessions the students are introduced to C++ concepts using a series of examples. Having examined the examples given in the session and having understood the concepts covered, the student should be able to complete open-ended problems. This course assumes no prior knowledge of C++.

CSCI 591. Directed Studies. 1-3 Credits.
An investigation of some specific area by an individual or small group of students working closely with a member of the graduate faculty. 1-3 credits in each graduate degree program. Prerequisites: Graduate standing and consent of instructor. Repeatable to 6 credits. F,S,SS.

CSCI 599. Research. 1-6 Credits.
This course is intended for Ph.D students to obtain credit for their research efforts. Repeatable to 21 credits. Repeatable to 21 credits. S/U grading.

CSCI 996. Continuing Enrollment. 1-12 Credits.

CSCI 997. Independent Study. 2 Credits.
Independent Study.

CSCI 998. Thesis. 1-9 Credits.
Thesis. Repeatable to 9 credits.

CSCI 999. Dissertation. 1-12 Credits.
Dissertation. Repeatable to 12 credits. F,S,SS.

Undergraduate Courses for Graduate Credit

CSCI 427. Cloud Computing. 3 Credits.
This is the undergraduate-level course on cloud computing models, techniques, and architectures. Cloud computing is an important computing model which enables information, software, and other shared resources to be provisioned over the network as services in an on-demand manner. This course introduces the current practices in cloud computing. Topics may include distributed computing models and technologies, Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS), Software-as-a-Service (SaaS), virtualization, performance and systems issues, capacity planning, disaster recovery, Cloud OS, federated clouds, challenges in implementing clouds, data centers, hypervisor CPU and memory management, and cloud hosted applications. S, even years.

CSCI 435. Formal Languages and Automata. 3 Credits.
A study of automata, grammars, and Turing machines as specifications for formal languages. Computation is defined in terms of deciding properties of formal languages, and the fundamental results of computability and decidability are derived. Prerequisites: CSCI 242 with a grade of C or better and minimum second semester junior standing. F.

CSCI 445. Mathematical Modeling and Simulation. 3 Credits.
A study of various mathematical applications for digital computers, including the modeling, simulation and interpretation of the solution of complex systems. Prerequisites: CSCI 161 or CSCI 170, and MATH 166 and a statistics course. F, even years.

CSCI 446. Computer Graphics I. 3 Credits.
Introduction to computer graphics. Topics include raster scan graphics, 2D and 3D representations, affine transformations, light and color, texture mapping, image processing, ray-tracing, and computer animation. Team-based weekly homework develops a 4 minute computer animation. Prerequisites: CSCI 242, CSCI 363, and MATH 166. F, odd years.

CSCI 448. Computer Graphics II. 3 Credits.
A continuation of CSCI 446, topics covered include: history of games, game taxonomies, game design theory, computer game development, physics engines and AI engines. Prerequisite: CSCI 446. S, even years.

CSCI 451. Operating Systems I. 3 Credits.
Introduction to operating system theory and fundamentals. Topics include: CPU scheduling, memory management, file systems, interprocess communication facilities, security. Weekly homework assignments focus on process synchronization using fork/exe, threads, mutexes, pipes, semaphores, and shared memory. Prerequisites: CSCI 242 and CSCI 370; both with a grade of C or better. F.

CSCI 452. Operating Systems II. 3 Credits.
A study of the implementation of operating systems and parts of operating systems, and development of system software. Prerequisites: CSCI 451. On demand.

CSCI 455. Database Management Systems. 3 Credits.
Database concepts, database design (ER, UML), database programming languages (SQL), NoSQL Database, Database Concurrency and recovery techniques, and Database security. Prerequisite: CSCI 242 with a grade of C or better. S, even years.

CSCI 457. Electronic Commerce Systems. 3 Credits.
A study of the system architecture, content design and implementation, and data analysis, management, and processing of electronic commerce. Topics include Internet basics, business issues, data management and processing, static and dynamic web programming, e-commerce content design and construction, and databases and host languages with embedded SQL. Prerequisite: CSCI 260 with course topic of Dot Net. S, odd years.

CSCI 463. Software Engineering. 3 Credits.
This course teaches software engineering principles and techniques used in the specification, design, implementation, verification and maintenance of large-scale software systems. Major software development methodologies are reviewed. As development team members, students participate in a group project involving the production or revision of a complex software product. Prerequisites: CSCI 242 and CSCI 363. S.

CSCI 465. Principles of Translation. 3 Credits.
Techniques for automatic translation of high-level languages to executable code. Prerequisites: CSCI 365 and CSCI 370. F, odd years.

CSCI 491. Seminars in Computer Science. 1 Credit.
A course for advanced students. Repeatable to 3 credits. Prerequisite: Consent of instructor. Repeatable to 3 credits. S/U grading. F,S.

Doctor of Philosophy in Scientific Computing

Admission Requirements

1. Master’s degree, normally in an engineering or science related field with an overall graduate GPA of at least 3.25 (on a 4.0 scale), or a Bachelor’s degree, normally in an engineering or science related field with an overall undergraduate GPA of at least 3.00 (on a 4.0 scale) and the Graduate Record Examination General Test.

2. Prerequisites:
   - Expertise in a high level language and a basic knowledge of data structures.
   - Basic knowledge of formal languages, automata, and computability.
   - Basic knowledge of computer architecture or operating systems.
   - Basic knowledge of calculus, statistics, and linear algebra.

3. Satisfy the School of Graduate Studies' English Language Proficiency requirements as listed in the Graduate Academic Information section.

The department recognizes that the prerequisite expertise identified above may be acquired in several ways. Students who do not meet all of the requirements may be admitted to qualified status with the obligation of meeting the remaining requirements early in their graduate study.

Degree Requirements

Students seeking the Doctor of Philosophy in Scientific Computing degree must satisfy all general requirements set forth by the School of Graduate Studies. In addition, they must meet the following requirements set by the Computer Science Department:

1. All students are required to obtain interdisciplinary graduate training. This requirement may be met by:
   a. Either taking two course clusters from the computational category and one course cluster from an applications category
   b. Or taking three course clusters from the computational category and conducting dissertation research in an applications category in the applicable department.
2. Course clusters must be approved by the student’s Faculty Advisory Committee.

3. Students may, with approval of the Computer Science Department's Graduate Committee, design their own applications category cluster.

4. The student’s Faculty Advisory Committee must include one member from the applicable applications cluster or dissertation research.

5. The Computer Science Department’s Graduate Committee must approve the Faculty Advisory Committee membership.

6. Students who have a degree in a field other than Computer Science are not required to obtain interdisciplinary graduate training. These students are required to take three computational category course clusters. In addition, the student's Faculty Advisory Committee will comprise only from Computer Science faculty.

7. Students with approved Bachelor degree:
   a. Must complete 51-66 credit hours of coursework;
   b. Must complete eight of the core courses.

8. Students with approved Master degree:
   a. Must complete 27-39 credit hours of coursework;
   b. Must complete four of the core courses.

9. Elective courses: CSci 500 and CSci 566 may not be used as electives. Only 3 credits of CSci 591 may be used as an elective.

10. Successful completion of written Graduate Qualifying Examination (GQE). The GQE’s passing cut off point will be higher than the GQE’s passing for Master Students (MS) taking the same exam. The GQE will consist of questions on each of the four areas. Moreover, the PhD students are required to complete GQE’s requirement within the first 4 semesters, but are strongly encouraged to complete the GQE earlier in their studies.

11. Successful completion of Graduate Comprehensive Exam (GCE).


13. Completion of CSci 999 Dissertation (12 credits maximum).

14. Final oral examination, which includes a defense of the dissertation.

CSCI 599 Research 1-21
CSCI 999 Dissertation 1-12

Core courses:

CSCI 513 Advanced Database Systems 3
CSCI 522 Theoretical Foundations of Computer Science 3
CSCI 532 High Performance Computing and Paradigms 3
CSCI 543 Machine Learning 3
CSCI 551 Security for Cloud Computing 3
CSCI 555 Computer Networks 3
CSCI 565 Advanced Software Engineering 3
CSCI 575 Analysis of Algorithms 3

Core Clusters:

Computational Clusters:

The computing clusters contain related courses that provide depth of knowledge in specialized computing systems or methods.

1. Software Engineering Cluster: Software engineering combines the ideas from engineering, management, and math disciplines in order to improve our ability to build complex software systems on time and within the budget. Requires any three of the following courses:

   CSCI 463 Software Engineering 3
   CSCI 562 Formal Specification Methods 3
   CSCI 565 Advanced Software Engineering 3
   CSCI 582 Software Architecture 3

2. Data Management Cluster: The cluster enhances a student’s knowledge in data engineering and management. It includes the study of database systems, data management, data mining and data warehousing, digital libraries and information retrieval and systems. Requires the following three courses:

   CSCI 455 Database Management Systems 3
   CSCI 513 Advanced Database Systems 3
   CSCI 515 Data Engineering and Management 3

3. Artificial/Computational Intelligence Cluster: The goal of this track is to provide the student with both classical and advanced topics in artificial and computational intelligence. It includes the study of problem solving methods, approximate reasoning, machine learning, decision making, data mining and other application techniques. Requires the following three courses:

   CSCI 543 Machine Learning 3
   CSCI 544 Soft Computing: Computational Intelligence I 3
   CSCI 554 Applications in AI/Computational Intelligence 3

4. Distributed Systems Cluster: The goal for this track is to provide the student with an understanding of the hardware technologies (hardware, network, and storage devices) required to develop a machine suitable for high performance computing. Requires the following three courses:

   CSCI 427 Cloud Computing 3
   CSCI 551 Security for Cloud Computing 3
   CSCI 555 Computer Networks 3

5. High Performance Computing Cluster: The cluster provides an understanding of the system architecture (hardware, network, and storage devices) and the software technologies (MPI, PVM, and Java) required to create a system capable of high performance computing. Requires the following three courses:

   CSCI 451 Operating Systems I 3
   CSCI 532 High Performance Computing and Paradigms 3
   CSCI 575 Analysis of Algorithms 3

6. Graphics and Visualization Cluster: The goal of this track is for the student to master the OpenGL graphics library, to develop a working understanding of signal and image processing techniques, and to be able to apply those skills to the visualization of results generated by complex computer simulations. Requires the following three courses:

   CSCI 446 Computer Graphics I 3
   CSCI 448 Computer Graphics II 3
   CSCI 547 Scientific Visualization 3

7. Modeling and Simulation Cluster: In this cluster the student will study the various techniques for developing mathematical models and software simulations to predict the behavior of complex physical phenomena. Requires the following three courses:

   MATH 460 Mathematical Modeling 3
   CSCI 445 Mathematical Modeling and Simulation 3
   CSCI 545 Discrete Dynamical Systems Modeling and Simulation 3

Application Clusters

The application clusters provide exposure to specific scientific disciplines that commonly make use of scientific computing methods. In addition to the clusters listed here, other clusters may be defined by the Faculty Advisory Committee with approval of the Computer Science Department’s Graduate Committee.

1. Computational Mathematics Cluster: This cluster provides an understanding of the computational methods used to solve complex mathematical problems on a digital computer. Requires three graduate level mathematics courses. Possible courses are:
Students who do not meet all of these prerequisites may be admitted if they are adequately prepared in the field of computer science. Applicants with a background in mathematics, science or engineering will also be considered if they are adequately prepared in the field of computer science.

Admission Requirements

1. Bachelor’s degree, normally in Computer Science.
2. Overall undergraduate GPA of at least 2.85.
3. Graduate Record Examination General Test or an undergraduate degree from a CSAB/ABET accredited degree program in Computer Science.
4. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.
5. International applicants who have received their bachelor’s or master’s degree in the United States or English-speaking Canada are not required to submit the TOEFL or IELTS.

Applicants with a background in mathematics, science or engineering will also be considered if they are adequately prepared in the field of computer science.

Students who do not meet all of these prerequisites may be admitted in Qualified or Provisional status with the obligation of meeting the remaining requirements early in their graduate study.

Degree Requirements

Students seeking the Master of Science degree CS must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Computer Science Department. More specifically, to obtain the MS in Computer Science, students must complete 30 hours depending on the tracks. There are two tracks:

1. Thesis track, which will be offered both online and on Campus. Students in thesis track are required to write and defend their theses.
2. Non-thesis, which will be offered ONLY online. Students in non-thesis track are required to fully develop, implement, and present a capstone project supervised by a graduate faculty member. The presentation, which is considered as a final oral examination, must be publicly presented to the faculty. Both tracks are required to take the same number of courses. The difference between the tracks are in the project, namely, capstone, and thesis. Both capstone and thesis are given the same weight.

An optional Data Science focus is available for those students who want to include some Data Science exposure in their program. This focus requires that the elective courses include three Data Science related courses as indicated below.

Non-Thesis Option (30 credit hours):

1. The core of required courses (9 credits):
   - CSCI 522 Theoretical Foundations of Computer Science 3
   - CSCI 513 Advanced Database Systems 3
   - CSCI 565 Advanced Software Engineering 3
2. Six elective courses (18 credits). Only the following courses may count towards the electives:
   - CSCI 427 Cloud Computing (*) 3
   - CSCI 515 Data Engineering and Management 3
   - CSCI 532 High Performance Computing and Paradigms (*) 3
   - CSCI 543 Machine Learning (*) 3
   - CSCI 544 Soft Computing: Computational Intelligence I 3
   - CSCI 547 Scientific Visualization 3
   - CSCI 551 Security for Cloud Computing 3
   - CSCI 554 Applications in AI/Computational Intelligence 3
   - CSCI 555 Computer Networks 3
   - CSCI 562 Formal Specification Methods 3
   - CSCI 575 Analysis of Algorithms 3

(*) CSCI 427, CSCI 532, and CSCI 543 are required for the optional Data Science focus.

3. Capstone Project (3 credits).
   - CSCI 994

4. Presentation of the Capstone Project results (CSCI 994 Capstone Project) including an oral presentation and written report (in a format suitable for publication) to the Faculty Advisory Committee, and interested faculty and students.

Thesis Option (30 credit hours):

1. The core of required courses (9 credits):
   - CSCI 522 Theoretical Foundations of Computer Science 3
   - CSCI 513 Advanced Database Systems 3
   - CSCI 565 Advanced Software Engineering 3
2. Five elective courses (15 credits). Only the following courses may count towards the electives:
   - CSCI 427 Cloud Computing (*) 3
   - CSCI 515 Data Engineering and Management 3
   - CSCI 532 High Performance Computing and Paradigms (*) 3
   - CSCI 543 Machine Learning (*) 3
   - CSCI 544 Soft Computing: Computational Intelligence I 3
   - CSCI 547 Scientific Visualization 3
   - CSCI 551 Security for Cloud Computing 3
   - CSCI 554 Applications in AI/Computational Intelligence 3

Master of Science in Computer Science

Admission Requirements

1. Bachelor’s degree, normally in Computer Science.
2. Overall undergraduate GPA of at least 2.85.
3. Graduate Record Examination General Test or an undergraduate degree from a CSAB/ABET accredited degree program in Computer Science.
4. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.
5. International applicants who have received their bachelor’s or master’s degree in the United States or English-speaking Canada are not required to submit the TOEFL or IELTS.

Applicants with a background in mathematics, science or engineering will also be considered if they are adequately prepared in the field of computer science.

Students who do not meet all of these prerequisites may be admitted in Qualified or Provisional status with the obligation of meeting the remaining requirements early in their graduate study.
Non-Thesis Option (30 credit hours):
1. The core of required courses (9 credits).
2. Two elective courses (6 credits). Only the following courses may count towards the electives:
   - CSCI 457 Electronic Commerce Systems 3
   - CSCI 544 Machine Learning 3
   - CSCI 547 Scientific Visualization 3
   - CSCI 543 Machine Learning 3
   - CSCI 551 Security for Cloud Computing 3
3. Analytics courses (9 credits).
5. A final oral examination, which includes a defense of the thesis to the Faculty Advisory Committee, and interested faculty and students.

Analytics clusters:
1. Business Analytics cluster (9 credit hours):
   - ECON 506 Econometrics 3
   - Select two of the following:
     - ECON 411 Economic Forecasting 3
     - ECON 510 Time Series Methods & Applications 3
     - ECON 534 Further Topics in Econometrics 3
     - ECON 545 Quantitative Methods for Impact Evaluation & Causal Inference 3
2. Educational Foundations and Research cluster (9 credit hours):
   - EFR 513 Large Dataset Management and Analysis 3
   - EFR 530 Learning Analytics 3
   - EFR 535 Data Analytics and Visualization with R 3
3. Behavioral Data Analytics cluster (9 credit hours):
   - PSYC 540 Foundations of Behavioral Data Analytics 3
   - PSYC 541 Advanced Univariate Statistics 3
   - PSYC 542 Multivariate Statistics for Psychology 3

Counseling Psychology and Community Services

M.A. in Counseling Psychology and Community Services (p. 375)
B.S./M.A. Combined Program (p. 373)
Ph.D. in Counseling Psychology (p. 373)
Minor in Counseling Psychology and Community Services (p. 377)

Graduate Certificate in Counseling with a K-12 emphasis (http://und-public.coursesleaf.com/graduateacademicinformation/ departmentalcoursesprograms/counselingpsychologyandcommunityservices/ coun-cert)
Courses

COUN 501. Ethics: Counseling and Counseling Psychology. 3 Credits.
Focus will be on the Ethical Principles of Psychologists and Code of Conduct of the American Psychological Association, the Codes of Ethics and Standard of Practice of the American Counseling Association and corresponding ethics codes for subspecialties within the counseling profession. Students will learn to interpret these codes and apply them to professional practice, supervision, research and teaching situations. F.

COUN 502. Professional Issues in Counseling. 1 Credit.
An introduction to counseling practice and services in mental health, addiction, and other community agencies. Emphasizes professional issues in the field, professional development and career paths, and related topics. Corequisite: COUN 501; only for students in the Community Agencies Emphasis and Addictions Emphasis.

COUN 503. Professional Issues: Internship and Job Preparation. 1 Credit.
This course explores the characteristics of professional counselor preparation, including identity development, professional organizations, licensure and certification, career paths, specializations in the field, and continuing education. Preparation for counseling internship will also be explored. Prerequisite: COUN 502 or COUN 506. F.

COUN 505. History of Psychology. 3 Credits.
Historical development of modern psychology with an emphasis on philosophical precursors to psychology, experimental and systematic phases of early psychological thought, important issues during the growth of psychology, and current and future trends. Prerequisite: Graduate standing in Counseling or Psychology.

COUN 506. Rehabilitation Counseling: Foundations and Ethical Issues. 3 Credits.
Comprehensive introduction to the rehabilitation profession, including past, present, and future trends. Areas emphasized: profession philosophy; organizational structure; historical and legislative influence; rehabilitation process and service delivery systems; professional issues, ethical codes, and behavior.

COUN 507. Life-Span Development in Counseling. 3 Credits.
This course examines the foundations of human development across the life span, including pre-natal issues, infancy, childhood, adolescence, adulthood, and aging. Theories that address biological neurological behavioral, social, cognitive, cultural, and environmental issues of development will be examined. Structural theories of growth, maturation, and aging will be presented with an emphasis on strategies and interventions used by counselors to deal with developmental processes and transitions. S,SS.

COUN 510. Counseling Methods. 3 Credits.
Two training components are combined to provide an intensive practicum experience. The didactic component introduces the basic interviewing and active listening skills; a laboratory component provides practice in the practical application of those skills in simulated counseling interviews.

COUN 514. Rehabilitation Counseling: Assessment and Evaluation. 3 Credits.
An introduction to assessment and related ethical issues in rehabilitation counseling. Assessment for vocational ability and independent living will be emphasized. Theory and research will be addressed, within a primarily applied framework.

COUN 515. Methods of Research. 3 Credits.
Methods and procedures of research development, design and analysis related to counseling and behavioral science. Experience in formulating and developing an individual research project. Considers research ethics and protection of human participants.

COUN 516. Counseling Research Laboratory. 1-3 Credits.
Introduces basic procedures in analysis of counseling research data. Topics including data coding, data entry and use of statistical packages are presented in an individualized manner. Prerequisite: COUN 515. Repeatable to 3 credits. S/U grading. F,SS.

COUN 517. Psychological Testing. 3 Credits.
The application of principles of psychological measurement to selected instruments in the areas of intellectual functioning and aptitudes; educational and occupational achievements; career interests; and personality. Development of test interpretation skills.

COUN 518. Group Theory and Process. 3 Credits.
Addresses the principles and practices of support, task, psycho-educational and therapeutic groups with various populations in a multicultural context. Includes study of professional issues relevant to group processes. Involves participation and leading group experiences.

COUN 519. Career Counseling. 3 Credits.
An introduction to the psychology of careers and to the practice of career counseling. Career development theories, occupational classification systems, assessment instruments, and the use of occupational information for career education and life planning are included. Career counseling strategies for use with a diverse population are introduced.

COUN 520. Diagnostic and Preventive Strategies in Counseling. 3 Credits.
This course will focus on the assessment and diagnosis of individual psychiatric disorders as defined by classification systems such as the Diagnostic Statistical Manual (DSM) and the International Classification of Diseases (ICD). Understanding of defined diagnostic disorders relative to the helping context will be emphasized. Knowledge of cultural concerns associated with classification systems will be explored. Emphasis will be placed on the following: assessment strategies designed to promote healthy human functioning; prevention strategies that focus on organizational/community/social justice advocacy; and the impact of diagnostic and prevention strategies on human functioning and wellness across the life span. S.

COUN 522. School Counseling and Program Management. 3 Credits.
Theory, research, and practice of K-12 school counseling and school counseling program management. S.

COUN 526. Educational Collaboration. 3 Credits.
The course focuses on the knowledge and skills essential to the consulting/collaboration process for professional school counselors in order to effectively support student adjustment and achievement. Collaboration for school improvement, program implementation, and work with parents, educators and professionals in the community is emphasized. Prerequisite: Enrollment in School Counseling Distance Program or permission of instructor.

COUN 527. School-Based Family Counseling. 3 Credits.
The course provides an overview of relevant theoretical models, approaches and specific issues of families in order for school personnel to facilitate student adjustment and achievement. Prerequisite: Enrollment in School Counseling Distance Program or permission of instructor.

COUN 529. Dynamics of Addiction. 3 Credits.
The course emphasizes the addiction and recovery process including vulnerability factors, diagnosis and treatment, and relapse prevention of addiction disorders for individuals and families. Shared characteristics of behavioral and chemical addictions, addiction theory, research, and policy will be addressed.

COUN 530. Theories of Counseling, Personality and Development. 3 Credits.
Study and analysis of counseling interventions based on different theoretical models, emphasizing personality and human development. Course involves viewing videotapes of simulated or actual counseling sessions, role-play demonstrations, and role played practice of various theoretically based counseling interventions.

COUN 531. Psychology of Women, Gender and Development. 3 Credits.
This course presents current research and trends in development theory, particularly theories pertaining to the psychological development of women and men. Issues such as abuse, ageism, depression, eating disorders, emotional experience and expression, heterosexism, feminism, and multiculturalism will be examined as related to the practice of psychology. Learning methods include writing, music, film, group discussion and creative projects. On demand.

COUN 532. Multicultural Counseling. 3 Credits.
This course offers an introduction to counseling theories and interventions appropriate for American ethnic and non-ethnic minority clients. The values suppositions of various cultural groups will be examined. In-class group experience is included.

COUN 533. Couples And Family Counseling. 3 Credits.
Prerequisite: COUN 510 or consent of instructor.

COUN 534. Child and Adolescent Counseling. 3 Credits.
Theory, research and practice of child and adolescent counseling. F.

COUN 540. Advanced Vocational Psychology. 3 Credits.
Advanced study of major career counseling theories, models, and methods. Prerequisites: COUN 519 or equivalent, and admission to doctoral program.
COUN 551. Research Issues in Counseling Psychology. 3 Credits.
This seminar is designed to increase students' self-efficacy and ability to examine critically research issues in Counseling Psychology and their relationship to practice. Students will further develop and demonstrate skills necessary to conduct the science of Counseling Psychology, including problem conceptualization, study design and the writing of proposals. Prerequisite: Admission to the doctoral program.

COUN 552. Counseling Psychology Professional Seminar I. 1 Credit.
An examination of the skills necessary for developing as a counseling psychologist trainee, with an emphasis on critical analysis, writing, and self-examination. Introduction to the breadth of competencies expected in counseling and professional psychology. Prerequisites: Admission to the doctoral program in Counseling Psychology. F.

COUN 553. Counseling Psychology Professional Seminar II. 1 Credit.
An introduction to the profession of Counseling Psychology, emphasizing the history of the specialty, the philosophical underpinnings of Counseling Psychology values, and the organizational structure of leadership in the discipline. Prerequisite: Admission to the doctoral program in Counseling Psychology.

COUN 554. Preparation for the Predoctoral Internship. 1 Credit.
A focused preparation of skills necessary for successful attainment of a predoctoral internship in Psychology. Emphasis on self-presentation and interview skills. Prerequisites: Admission to doctoral program in Counseling Psychology or Clinical Psychology and permission of the instructor.

COUN 555. Advanced Psychometrics. 3 Credits.
This lecture/lab course allows students to become familiar with fundamental concepts of psychological measurement. The emphasis of the course is on test development strategies based in classical testing theory, but also includes an introduction to item response theory. Additional purposes include gaining knowledge of APA standards of assessment and their application to the profession of Counseling Psychology and related fields. Finally, the application of psychometric theory to relevant assessment instruments and the cultural implications of these applications are addressed. Prerequisites: COUN 517 or equivalent, and permission to doctoral program. F, even years.

COUN 560. Supervision Theory and Technique. 3 Credits.
A survey and critical examination of approaches, techniques and issues in providing supervision and consultation. Includes reading of current theory and research on supervision and consultation, critical analysis of approaches to supervision, demonstrations, and role-played experiences of different supervision techniques. Prerequisite: Admission to the doctoral program in Counseling Psychology, the Master's program in Counseling, the doctoral program in Clinical Psychology or instructor permission. S.

COUN 561. Consultation Theory and Practice. 2 Credits.
This course provides an introduction to theories, models and practices of mental health and psychological consultation and collaboration. Consultant roles, for both program and case consultation, will be defined. Practices include initiating and developing a consultation relationship, developing a consultation contract, enacting the contract, and consultation process.

COUN 562. Consultation Laboratory. 1 Credit.
Under supervision by a member of the faculty, students will develop and implement a consultation project with an organization or client from the community. Prerequisite or Corequisite: COUN 561. S/U grading.

COUN 563. Advanced Application of APA Ethical Standards. 2 Credits.
This elective course is designed for students in the second or third year of doctoral study, those who have already completed some work with clients and are seeking an opportunity to think more critically about the application of ethical expectations to professional work. The course will emphasize the integration of ethical and legal standards and the implementation of such standards in case-based exercises.

COUN 564. Advanced Therapy Techniques. 3 Credits.
This elective course is designed for advanced students who are engaged in clinical practice and have completed COUN 530 (Theories of Counseling Personality and Development) or its equivalent. The course will provide focused discussion and application of various evidence-supported techniques to case material. Prerequisite: COUN 530.

COUN 565. Professional Seminars. 1-3 Credits.
Seminars are designed to present current research and supplement coursework in several areas. May be repeated up to eight credits. Repeatable to 8 credits. S/U grading.

COUN 566. Personality Assessment. 3 Credits.
Theory, research, evidence, and training in the administration, scoring, interpretation and use of personality assessment instruments. Clinical interviewing and checklists, behavioral observations and report writing skills. Issues of race, ethnicity, gender, age and disability in the use of these instruments is emphasized. A two-hour lab provides supervised practice in test administration and scoring. Prerequisites: COUN 517 or equivalent, and admission to the doctoral program or permission of instructor.

COUN 569. Cognitive Assessment. 3 Credits.
Theory, research, evidence, and training in the administration, scoring, interpretation and use of cognitive assessment instruments. Clinical interviewing and checklists, behavioral observations and report writing skills. Issues of race, ethnicity, gender, age and disability in the use of these instruments is emphasized. A two-hour lab provides supervised practice in test administration and scoring. Prerequisites: COUN 517 or equivalent, and admission to the doctoral program or permission of instructor.

COUN 570. Cognitive Assessment Measures in Special Education. 3 Credits.
Theory, research, evidence, and training in the administration, scoring, interpretation and use of cognitive assessment measures. Practice in behavioral observations and report writing skills. Issues of race, ethnicity, gender, age and disability in the use of these instruments is integrated throughout. Prerequisite: Admission to the Doctor of Education program or permission of instructor. On demand.

COUN 580. Counseling Practicum. 4 Credits.
Introduction to counseling practice. Emphasis on development, improvement, and evaluation of counseling relationships. Interview skills in counseling practice with live supervision. Prerequisites: COUN 510 and Instructor permission. Prerequisite or Corequisite: COUN 530. F, S, SS.

COUN 581. School Counseling Practicum. 1-4 Credits.
Introduction to counseling practice in a school setting. Emphasis on improvement and evaluation of individual and group counseling relationships. Development of skills in applying the role of counselor to the school environment. Prerequisites: COUN 501, COUN 510 and COUN 530, or permission of the instructor; 10 completed COUN credits. Repeatable to 4 credits. S/U grading. S, SS.

COUN 582. Child and Adolescent Counseling Internship. 6 Credits.
Professional practice in counseling, assessment, consultation, teaching, or research in an approved agency specializing in child and adolescent counseling. Supervision must meet criteria established by the department and the Graduate School. Department permission needed for summer enrollment. Graded SP/UP. Prerequisite: COUN 580. Repeatable to 12 credits. F, S.

COUN 583. Doctoral Practicum. 1-2 Credits.
Participation in the activities of a counseling agency or similar appropriate organization. Continued development of counseling, assessment, and consultation skills with individuals, couples, groups, organizations, and communities in a multicultural context. Participation in small group and individual supervision and in case conferences. This course is graded as SP/UP. Prerequisite: Admission to doctoral program. Repeatable to 12 credits. F, S, SS.

COUN 584. Community Counseling Internship. 6 Credits.
Professional practice in counseling, assessment, consultation, teaching, or research in an approved community agency. Supervision must meet criteria established by the department and the Graduate School. Department permission needed for summer session enrollment. Graded SP/UP. Prerequisite: COUN 580. Repeatable to 12 credits. F, S.

COUN 585. Counseling Psychology Research Practicum. 1-3 Credits.
This course involves student participation in one of several, topical research groups conducted by faculty on an ongoing basis. Groups will design and carry out research studies, and prepare manuscripts for publication. May be repeated up to 8 credits. Repeatable to 8 credits. S/U grading.

COUN 586. Practicum in Supervision. 1-3 Credits.
Supervised experience in providing supervision to counselors-in-training. Experience may be gained in supervising beginning students in role-played labs, live supervision in practicum, individual supervision, and/or small group supervision of interns. May be repeated up to 6 credits. Prerequisite: COUN 560. Repeatable to 6 credits. S/U grading.
COUN 587. Addictions Counseling Internship. 6 Credits.
Professional practice in counseling, assessment, consultation, teaching, or research in an approved agency specializing in addictions counseling. Supervision must meet criteria established by the department and the Graduate School. Department permission needed for SS enrollment. Graded SP/UP. Prerequisite: COUN 580. Repeatable to 12 credits. F.S.

COUN 588. Rehabilitation Counseling Internship. 6 Credits.
Professional practice in counseling, assessment, consultation, teaching, or research in an approved agency specializing in rehabilitation counseling. Supervision must meet criteria established by the department and the Graduate School. Department permission needed for SS enrollment. Graded SP/UP. Prerequisite: COUN 580. Repeatable to 12 credits. F.S.

COUN 589. School Counseling Internship. 3-6 Credits.
Supervised internship in a school setting. Emphasis on observing and performing guidance and counseling methods and techniques. Knowledge and performance of the roles and duties of professional school counselors. Supervision must meet criteria established by the department and the Graduate School. Prerequisite: COUN 518. Repeatable to 12 credits. S/U grading. F.S.SS.

COUN 590. Problems in Counseling. 1-3 Credits.
Supervised independent study or application of selected problems in the counseling field. Repeatable. S/U grading.

COUN 593. Readings in Counseling. 1-3 Credits.
Reading in selected areas of counseling. May be repeated up to six credits. Repeatable to 6 credits. S/U grading.

COUN 995. Scholarly Project. 1-2 Credits.
The scholarly project will be collaborative investigations by two or more students of a relevant topic within the Counseling profession. Before initiating the project students must obtain approval from designated faculty. Prerequisites: Enrollment in either the on-campus Counseling MA program or the School Counseling online program. Prerequisite or Corequisite: COUN 515. Repeatable to 3 credits. F.S.SS.

COUN 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

COUN 997. Independent Study. 2 Credits.

COUN 998. Thesis. 1-9 Credits.
Repeatable to 9 credits.

COUN 999. Dissertation. 1-15 Credits.
Repeatable to 15 credits.

Bachelor of Science in Rehabilitation and Human Services/Master of Arts in Counseling

Admission Requirements

The deadline for a completed application to be received in the School of Graduate Studies is February 1. In addition to the admission requirements for the Counseling Master’s program, a completed application must include the following:

1. A plan of study must be filed which demonstrates when course requirements will be taken to meet the requirements of the major or minor in Rehabilitation and Human Services and the MA in Counseling is required as part of the application process to this Combined Degree program. Individuals who are obtaining the BS degree in RHS are not required to complete RHS 997 - Internship in Rehabilitation, but are required to complete Coun 588 - Rehabilitation Counseling Internship. With this exception, all other requirements of the RHS major or minor and the Coun MA degree must be met.

2. Part I - Essential Studies Requirements

Part II - College of EHD Requirements

Part III - Core Curriculum for RHS Majors (except RHS 497)

Part IV - Extra-Departmental Requirements for RHS Majors

Part V - One 10-credit Concentration for RHS Majors

For RHS Minors - 15 Credits of Required Courses and 5 Credits of Listed Electives

3. Minimum GPA of 3.0 in all undergraduate work.

4. Written statement of interest in Rehabilitation Counseling as a profession.

Students are granted approved admission status in the School of Graduate Studies when they have completed a total of 125 undergraduate credits with an overall GPA of 3.0 or higher. This program allows students to designate two three-credit graduate courses to count for both degrees. These courses would be COUN 514 Rehabilitation Counseling: Assessment and Evaluation and COUN 519 Career Counseling.

The B.S. degree and the minor in Rehabilitation and Human Services, along with the M.A. degree in Counseling are granted at the same time. In the event that a student does not complete the graduate degree, the B.S. degree is granted only after the completion of 120 credits, including an approved rehabilitation internship.

Degree Requirements

1. Completion of an additional 24 undergraduate credits during or after the senior year.

2. Completion of at least 60 credits of graduate course work, including:

COUN 502  Professional Issues in Counseling  1
COUN 506  Rehabilitation Counseling: Foundations and Ethical Issues  3
COUN 507  Life-Span Development in Counseling  3
COUN 510  Counseling Methods  3
COUN 514  Rehabilitation Counseling: Assessment and Evaluation  3
COUN 515  Methods of Research  3
COUN 518  Group Theory and Process  3
COUN 519  Career Counseling  3
COUN 520  Diagnostic and Prevention Strategies in Counseling  3
COUN 529  Dynamics of Addiction  3
COUN 530  Theories of Counseling, Personality and Development  3
COUN 531  Psychology of Women, Gender and Development  3
COUN 532  Multicultural Counseling  3
COUN 533  Couples And Family Counseling  3
COUN 534  Child and Adolescent Counseling  3
COUN 569  Child and Adolescent Cognitive and Personality Assessment  3
COUN 580  Counseling Practicum  4

3. Completion of 8 credits of COUN 588 Rehabilitation Counseling Internship.

4. Completion of COUN 995 Scholarly Project (1 cr.), COUN 997 Independent Study (2 cr.) or COUN 998 Thesis (4 cr.).

Doctor of Philosophy in Counseling Psychology

Admission Requirements

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. Keep grade of B or higher in at least four graduate level counseling courses or equivalent, including Counseling Methods, Theories and Techniques of Counseling, Counseling Practicum and Research Methods (for post-Master’s applicants).

2. Overall GPA of 3.0.

3. Eighteen (18) semester credits of undergraduate psychology including coursework in general psychology, developmental psychology, abnormal psychology, personality theory, experimental and research methods, and statistics.

4. Graduate Record Examination—General Test, verbal, quantitative and writing.
5. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

Students are selected on the basis of undergraduate GPA, master’s degree GPA (if applicable), evaluations of pre-practicum and practicum performance when appropriate to the master’s degree program, scores on the verbal, quantitative and writing subsets of the Graduate Record Examination, references, vocational training and experiences, career goals, and perceived “best fit” by the admissions committee based on the applicant’s personal statement and the research and clinical interests of the faculty. Doctoral graduates from a recent three-year period have had the following average grades and scores: undergraduate GPA 3.44, master’s GPA 3.88, GRE-V 538, GRE-Q 603 and GRE-W 4.97. A balance between numbers of male and female students is preferred in the program. Students from minority ethnic groups are strongly encouraged to apply.

Degree Requirements

Students seeking the Doctor of Philosophy degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Counseling Psychology and Community Services Department.

Below is a list of coursework required to complete a Ph.D. in Counseling Psychology (students entering with a Master’s degree in Counseling or Psychology can transfer verified equivalent courses, except that COUN 501 can not be transferred). COUN 995/997/998 is only required for students who are Direct Admits (post-bachelors degree).

COUN 501 Ethics: Counseling and Counseling Psychology 3
COUN 505 History of Psychology 3
COUN 510 Counseling Methods 3
COUN 515 Methods of Research 3
or EFR 509 Introduction to Applied Educational Research 3
COUN 517 Psychological Testing 3
COUN 518 Group Theory and Process 3
COUN 519 Career Counseling 3
COUN 530 Theories of Counseling, Personality and Development 3
COUN 532 Multicultural Counseling 3
COUN 533 Couples And Family Counseling 3
COUN 534 Child and Adolescent Counseling 3
COUN 540 Advanced Vocational Psychology 3
COUN 551 Research Issues in Counseling Psychology 3
COUN 552 Counseling Psychology Professional Seminar I 3
COUN 553 Counseling Psychology Professional Seminar II 3
COUN 554 Preparation for the Predoctoral Internship I 3
COUN 560 Supervision and Consultation Theory and Practice 3
EFR 512 Survey and Test Design 3
COUN 568 Adult Cognitive and Personality Assessment 3
COUN 599 Child and Adolescent Cognitive and Personality Assessment 3
COUN 580 Counseling Practicum 4
COUN 583 Doctoral Practicum 6-12
COUN 584 Community Counseling Internship 12
or COUN 582 Child and Adolescent Counseling Internship 12
COUN 586 Practicum in Supervision 1-3
COUN 999 Dissertation 1-15
COUN 995 Scholarly Project COUN 998 is 4 cr.; COUN 995 and 997 are 2 cr.
COUN 998 Thesis 2-4
or COUN 997 Independent Study
UNIV 994 Professional Internship 1
COUN 565 Professional Seminars (Interprofessional Health Care) 1-3
or MPH 504 Planning and Management to Promote Health 1-3
or MPH 510 Public Health & Health Care Systems 1-3
or MPH 541 Public Health Communication 1-3

Coursework in Discipline Specific Knowledge:

PSYC 537 Physiology of Behavior and Psychophysiological Measurement 3
PSYC 539 Cognitive Psychology 3
PSYC 551 Advanced Developmental Psych 3
PSYC 560 Advanced Social Psychology 3

Coursework in Research Methodologies (select one of the following options):

Option A
PSYC 541 Advanced Univariate Statistics 3
PSYC 542 Multivariate Statistics for Psychology 3
or EFR 518 Multivariate Analysis 3

Option B
EFR 516 Statistics II 3
EFR 518 Multivariate Analysis 3
or EFR 523 Structural Equation Modeling 3

Option C
PSYC 541 Advanced Univariate Statistics 3
EFR 510 Qualitative Research Methods 3
EFR 520 Advanced Qualitative Research Methods 3
or EFR 522 Mixed-Methods Research 3

Coursework in Assessment/Diagnosis:

COUN 520 Diagnostic and Prevention Strategies in Counseling 3
COUN 517 Psychological Testing 3
COUN 568 Adult Cognitive and Personality Assessment 3
COUN 599 Child and Adolescent Cognitive and Personality Assessment 3

Optional Child and Adolescent Emphasis:

Students must be selected or approved by the program to complete the optional Child and Adolescent Counseling Emphasis. Related to the course requirements listed below, their dissertation topic must involve children and/or adolescents in some capacity (approved by their dissertation committee) and they must complete two practica with a child/adolescent focus.

COUN 534 Child and Adolescent Counseling 3
COUN 569 Child and Adolescent Cognitive and Personality Assessment 3
COUN 533 Couples And Family Counseling 3
COUN 999 Dissertation 1-15
PSYC 551 Advanced Developmental Psych 3
COUN 583 Doctoral Practicum 1-2

Other Program Requirements:

A. Coursework/experiences to fulfill two Scholarly Tools;
B. Specialization Area;
C. Research Mentorship Sequence;
D. Teaching Experience;
E. Social Justice Project;
F. Professional Benchmark;
G. Accumulation of Supervised Experience in Practice Settings;
H. Behavioral Healthcare Rotation;
I. Integrated Assessment;
J. Observed Structured Clinical Examination (OSCE);
K. Successful Completion of Comprehensive Examinations;
L. Successful Defense of the Dissertation; and
M. Internship.

See the Counseling Psychology Ph.D. handbook for more details.

**Cognate in Counseling Psychology and Community Services**

A cognate in CPC, consisting of a minimum of nine semester credits of counseling coursework, may be taken by master’s or doctoral students in related fields. Cognate coursework should be planned in consultation with a member of the department faculty. Cognates will not include practicum or internship; students interested in these experiences should consider a formal minor in Counseling (below).

**Program Evaluation of Students**

The CPC faculty conduct periodic reviews of students’ progress in the MA and PhD programs, including their academic performance, counseling and psychocultural skills, professionalism, and ethics. An interview may be required as part of the review. Deficits identified through faculty review may result in either a requirement that the student engage in remedial work or the removal of the student from the program.

As noted in Standard 7.04 of the 2017 Ethics Code of the American Psychological Association, students may need to disclose personal information if that information is necessary to evaluate or obtain assistance for students whose personal problems could reasonably be judged to be preventing them from performing their training or professionally related activities in a competent manner or posing a threat to the students or others.

The practice of counseling requires significant self-disclosure for the person receiving counseling. CPC students must become very familiar with this process. Therefore, it is an essential training component of the CPC programs to provide assignments and classroom experiences that call for student self-disclosure of a personal nature, in an atmosphere of respect and confidentiality, to an extent not expected in other academic disciplines. The nature or extent of expected self-disclosure is specified in each course syllabus.

**Master of Arts in Counseling Psychology and Community Services**

**Admission Requirements**

**On-Campus M.A. Emphasis**

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. A four-year bachelor’s degree from a recognized college or university (or be in a combined program).
2. Twenty semester credits of coursework in the behavioral sciences at the undergraduate level, which must include theories of personality, abnormal psychology, developmental psychology, and statistics. Additional courses in psychology and sociology may be applied toward this prerequisite. Courses in other social science disciplines where the focus is on the description or explanation of individual or group behavior may be accepted in fulfillment of this prerequisite at the discretion of the department. Applicants must submit this information on the “Supplemental Application Form and Undergraduate Coursework Summary.”
3. A cumulative Grade Point Average (GPA) of at least 2.75 for all undergraduate work or a GPA of at least 3.0 for the junior and senior years of undergraduate work (based on A=4.00).
4. Satisfactory performance on the Graduate Record Exam General Test or the Miller Analogies Test.
5. Favorable recommendations and the admission committee’s perception of the “best fit” based on the applicant’s personal statement.
6. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

**On-Campus M.A. Degree Requirements**

Students seeking the Master of Arts degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Counseling Psychology and Community Services programs.

**Thesis Option:**

1. A minimum of sixty (60) semester credits, including the credits granted for the thesis and the research leading to the Thesis.
2. At least one-half of the credits must be at or above the 500-level.
3. A maximum of one-fourth (15 semester credits) of the credit hours required for the degree may be transferred from another institution.
4. Preparation of a written thesis approved by the faculty advisor and Thesis committee.
5. Comprehensive final examination.
6. Required Core and Emphasis courses.

**Non-Thesis Option:**

1. A minimum of sixty (60) semester credits, including at least two credits of Independent Study or Scholarly Project.
2. At least one-half of the credits must be at or above the 500-level.
3. A maximum of one-fourth (15 semester credits) of the credit hours required for the degree may be transferred from another institution.
4. Preparation of a written independent study or scholarly project approved by the faculty advisor.
5. Comprehensive final examination.
6. Required Core and Emphasis courses.

**Required Core Courses:**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COUN 502</td>
<td>Professional Issues in Counseling</td>
<td>1</td>
</tr>
<tr>
<td>COUN 507</td>
<td>Life-Span Development in Counseling</td>
<td>3</td>
</tr>
<tr>
<td>COUN 510</td>
<td>Counseling Methods</td>
<td>3</td>
</tr>
<tr>
<td>COUN 515</td>
<td>Methods of Research</td>
<td>3</td>
</tr>
<tr>
<td>or EFR 509</td>
<td>Introduction to Applied Educational Research</td>
<td></td>
</tr>
<tr>
<td>COUN 518</td>
<td>Group Theory and Process</td>
<td>3</td>
</tr>
<tr>
<td>COUN 519</td>
<td>Career Counseling</td>
<td>3</td>
</tr>
<tr>
<td>COUN 520</td>
<td>Diagnostic and Prevention Strategies in Counseling</td>
<td>3</td>
</tr>
<tr>
<td>COUN 529</td>
<td>Dynamics of Addiction</td>
<td>3</td>
</tr>
<tr>
<td>COUN 530</td>
<td>Theories of Counseling, Personality and Development</td>
<td>3</td>
</tr>
<tr>
<td>COUN 532</td>
<td>Multicultural Counseling</td>
<td>3</td>
</tr>
<tr>
<td>COUN 533</td>
<td>Couples And Family Counseling</td>
<td>3</td>
</tr>
<tr>
<td>COUN 534</td>
<td>Child and Adolescent Counseling</td>
<td>3</td>
</tr>
<tr>
<td>COUN 580</td>
<td>Counseling Practicum</td>
<td>4</td>
</tr>
<tr>
<td>COUN 995</td>
<td>Scholarly Project (or COUN 997 or COUN 998 with special permission)</td>
<td>2-4</td>
</tr>
<tr>
<td>or COUN 997</td>
<td>Independent Study</td>
<td></td>
</tr>
<tr>
<td>or COUN 998</td>
<td>Thesis</td>
<td></td>
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</tbody>
</table>

**Total Credits**

40-42

**Plus One of the Following Emphasis Areas:**

**Addiction Counseling Emphasis**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COUN 501</td>
<td>Ethics: Counseling and Counseling Psychology</td>
<td>3</td>
</tr>
<tr>
<td>COUN 517</td>
<td>Psychological Testing</td>
<td>3</td>
</tr>
<tr>
<td>COUN 587</td>
<td>Addictions Counseling Internship (2 semesters; 6 credits/semester)</td>
<td>12</td>
</tr>
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</table>

**Electives (i.e.)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>COUN 505</td>
<td>History of Psychology</td>
<td>2-6</td>
</tr>
<tr>
<td>COUN 560</td>
<td>Supervision and Consultation Theory and Practice</td>
<td></td>
</tr>
</tbody>
</table>
School Counseling Emphasis - Online

A Master of Arts in Counseling, with a school counseling emphasis is offered via a synchronous online program. The School Counseling emphasis prepares students to be culturally responsive professional school counselors who promote the academic, career, personal, and social development of K-12 students while being collaborative social justice leaders in their school communities. Completion of coursework prepares students to be credentialed from the North Dakota Department of Public Instruction as a School Counselor and is compatible with licensure or credentialing requirements in other states. Program graduates are also eligible to pursue the Licensed Professional Counselor credential in North Dakota, as well as other states.

Through online courses, practical experiences, and two four day on-campus visits for two consecutive summers, students are prepared to practice as culturally responsive and social justice oriented professional school counselors in elementary schools, middle schools, and high schools. Students receive a broad, theoretical foundation in counseling, plus hands-on experiences. Social justice, advocacy, and culturally responsive training and practices are integrated throughout the curriculum.

Online M.A. Degree Admission Requirements

In order to be considered for admission to the K-12 School Counseling Emphasis you will need the following:

1. A Bachelor's degree (or higher) from a regionally accredited institution.
2. Completion of at least 20 semester credits of coursework in the behavioral sciences at the undergraduate level. These 20 credits must include the following prerequisites: Statistics, Educational Psychology, Instructional Methods, and Classroom Management. Applicants who have not completed these courses upon application can be provisionally admitted to the program, and will then have one year to complete these requirements.
3. An overall grade point average (based on 4.00 scale) of 2.75 or higher in an undergraduate degree program or at least 3.00 for the last two years of undergraduate work.
4. Completion of the School Counseling Supplemental Application Form (part of the My GradSpace (http://graduateschool.und.edu/my-gradspace.cfm) application).
5. Submission of a two-three page personal statement outlining your goals and objectives for seeking the graduate degree in Counseling (K - 12 School Counseling Emphasis), including your academic or professional accomplishments as well your career goals. Additionally, clearly identify the roles of a school counselor and how your experiences and interests relate to this role.
6. Submission of three letters of recommendation from those who can comment on your academic abilities.
7. Submission of a professional resume.
8. An online interview (via web-conferencing) with program faculty. This is required for all students who are being considered for admission.

Online M.A. Degree Requirements

- Students may enroll in the school counseling practicum after satisfactorily completing at least ten credits in the program. After successfully completing practicum, students will enroll in Internship in School Counseling which is a two-semester 600-hour (12 credit) supervised counseling experience at elementary and/or secondary school sites near where you live. Internship will typically be completed during the final semesters of the program. Internship placements are individually arranged in collaboration with the M.A. Counseling (K - 12 School Counseling Emphasis) Coordinator.
- In addition to the professional school counseling course sequence, students are required to complete a series of research training experiences, culminating in the completion of a scholarly project conducted under the direction of the student’s advisor. Students are encouraged to begin considering and planning their scholarly project early in their program.

After completing the majority of coursework for the degree and advancing to candidacy, students are eligible to sit for the Master’s Comprehensive Examination during their final spring semester. A passing score on the examination is required for graduation.

Courses

<table>
<thead>
<tr>
<th>Course Code</th>
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<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>COUN 501</td>
<td>Ethics: Counseling and Counseling Psychology</td>
<td>3</td>
</tr>
<tr>
<td>COUN 507</td>
<td>Life-Span Development in Counseling</td>
<td>3</td>
</tr>
<tr>
<td>COUN 510</td>
<td>Counseling Methods</td>
<td>3</td>
</tr>
<tr>
<td>COUN 515</td>
<td>Methods of Research</td>
<td>3</td>
</tr>
<tr>
<td>COUN 516</td>
<td>Counseling Research Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>COUN 517</td>
<td>Psychological Testing</td>
<td>3</td>
</tr>
<tr>
<td>COUN 518</td>
<td>Group Theory and Process</td>
<td>3</td>
</tr>
<tr>
<td>COUN 555</td>
<td>Professional Seminars</td>
<td>3</td>
</tr>
<tr>
<td>COUN 582</td>
<td>Child and Adolescent Counseling Internship</td>
<td>3</td>
</tr>
<tr>
<td>COUN 584</td>
<td>Community Counseling Internship (New Course Request)</td>
<td>3</td>
</tr>
<tr>
<td>COUN 585</td>
<td>Counseling Psychology Research Practicum</td>
<td>3</td>
</tr>
<tr>
<td>COUN 586</td>
<td>Rehabilitation Counseling: Foundations and Ethical Issues</td>
<td>3</td>
</tr>
<tr>
<td>COUN 588</td>
<td>Rehabilitation Counseling Internship (2 semesters; 6 credits/semester)</td>
<td>12</td>
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<tr>
<td>Electives (i.e.)</td>
<td></td>
<td>2-6</td>
</tr>
<tr>
<td>COUN 506</td>
<td>Rehabilitation Counseling: Foundations and Ethical Issues</td>
<td>3</td>
</tr>
<tr>
<td>COUN 514</td>
<td>Rehabilitation Counseling: Assessment and Evaluation</td>
<td>3</td>
</tr>
<tr>
<td>COUN 517</td>
<td>Psychological Testing</td>
<td>3</td>
</tr>
<tr>
<td>COUN 518</td>
<td>Professional Seminars</td>
<td>3</td>
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<tr>
<td>COUN 520</td>
<td>Counseling Psychology Research Practicum</td>
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<td>COUN 555</td>
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<tr>
<td>Electives (i.e.)</td>
<td></td>
<td>2-6</td>
</tr>
<tr>
<td>COUN 516</td>
<td>Supervision and Consultation Theory and Practice</td>
<td>3</td>
</tr>
<tr>
<td>COUN 517</td>
<td>Psychological Testing</td>
<td>3</td>
</tr>
<tr>
<td>COUN 518</td>
<td>Counseling Psychology Research Practicum</td>
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<td>Child and Adolescent Counseling Internship</td>
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<tr>
<td>Electives (i.e.)</td>
<td></td>
<td>2-6</td>
</tr>
<tr>
<td>COUN 516</td>
<td>Supervision and Consultation Theory and Practice</td>
<td>3</td>
</tr>
<tr>
<td>COUN 517</td>
<td>Psychological Testing</td>
<td>3</td>
</tr>
<tr>
<td>COUN 518</td>
<td>Counseling Psychology Research Practicum</td>
<td>3</td>
</tr>
</tbody>
</table>
Repeatable. Social research. The course examines epistemological and ontological debates in punishment, but extra-legal punishments and their relationship to criminal punishment as a feature of human social life. Emphasis is placed on criminal viewpoints (e.g., Marxist, feminist, post-modern, and peacemaking perspectives).  Prerequisite: CJ 510. Repeatable to 18 credits.

CJ 522. Qualitative Research Methods in Criminal Justice. 3 Credits. An examination of the underlying rationale, methods, and limitations of qualitative research in criminal justice. Topics include ethnographic research, action research, historical research, case studies, and content analysis.

CJ 525. Advanced Quantitative Methods/Analysis. 3 Credits. This course is intended to familiarize students with advanced multivariate statistical techniques. Topics include regression analysis, factor analysis and path analysis. Other specific statistical analysis techniques may also be explored. Prerequisite: SOC 521 or consent of the instructor.

CJ 526. Special Topics in Quantitative Analysis. 3 Credits. Variable topics exploring advanced statistical methods/analytical techniques such as time-series analysis, structural equation models, logistics regression, hierarchical linear modeling, categorical-data analysis and general linear models. Topics to be determined based on student demand. Prerequisite: CJ 525 or consent of instructor. Repeatable.

CJ 530. Theories of Counseling, Personality and Development. 3 Credits.

CJ 532. Multicultural Counseling. 3 Credits.

CJ 534. Child and Adolescent Counseling. 3 Credits.

CJ 581. School Counseling Practicum. 4 Credits.

CJ 589. School Counseling Internship. (6 CR, 12 total) 12 Credits.

CJ 995. Scholarly Project. 2 Credits.

or COUN 997. Independent Study

Total Credits

60

Minor in Counseling Psychology and Community Services

A minor in the Department of CPCS consisting of a minimum of 20 semester credits of counseling coursework may be taken by master’s or doctoral students majoring in a related field. Such a minor should include the following five courses:

COUN 510 Counseling Methods 3 Credits.

COUN 517 Psychological Testing 3 Credits.

COUN 519 Career Counseling 3 Credits.

COUN 530 Theories of Counseling, Personality and Development 3 Credits.

COUN 532 Multicultural Counseling 3 Credits.

All doctoral students who wish to complete a minor in the department must include a Counseling faculty member on the Faculty Advisory Committee and should seek advice about appropriate courses and course sequences.

Criminal Justice

Ph.D. in Criminal Justice Studies (p. 378)

Courses

CJ 510. Historical Perspectives in Criminology. 3 Credits. An overview of the development of western criminological thought from the enlightenment to the mid-twentieth century. The course examines viewpoints ranging from the demonic perspective to early learning, anomie/strain, social disorganization, labeling, and conflict theories.

CJ 511. Contemporary Perspectives in Criminology. 3 Credits. An overview of developments in criminological thought from the mid-twentieth century to the present. The course examines the growth of mainstream viewpoints (e.g., anomie/strain, learning, and control theories) and critical criminology (e.g., Marxist, feminist, post-modern, and peacemaking perspectives). Prerequisite: CJ 510.

CJ 515. Human Nature and Crime. 3 Credits. This course examines historical and contemporary applications of the concept of “human nature” in explanations of criminal behavior. Attention is also given to the role played by “human nature” in the evaluation of social institutions that react to crime and deviance. Finally, attempts to integrate biological and cultural explanations of human behavior as they pertain to crime will be addressed. Prerequisite: CJ 510.

CJ 516. Theories of Punishment. 3 Credits. This course surveys the variety of attempts to describe, justify and explain punishment as a feature of human social life. Emphasis is placed on criminal punishment, but extra-legal punishments and their relationship to criminal punishments are also explored. Prerequisite: CJ 510.

CJ 520. Topics in Research Methods. 3 Credits. An examination of philosophical underpinnings of the scientific method in social research. The course examines epistemological and ontological debates in contemporary social research and their application to research design. Repeatable.
Doctor of Philosophy in Criminal Justice Studies

Admission Requirements
In addition to the admission requirements of the School of Graduate Studies, the following requirements must be met by all applicants with the exception of those applying under the J.D./Ph.D. specialization:

1. A master’s degree in criminal justice or a related field.
2. A cumulative G.P.A. of at least 3.0 for all coursework taken for graduate credit.
3. Achieve a minimum combined score of 300 on the verbal and quantitative components of the revised Graduate Record Exam (GRE), or a minimum combined score of 1,000 on earlier versions of the GRE.
4. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

Combined J.D./Ph.D Option: Students currently enrolled in an ABA accredited law school or individuals with a Juris Doctorate (J.D.) from an ABA accredited law school may be eligible for admission to the Ph.D. program in criminal justice. Interested individuals should contact the graduate program director for details.

Degree Requirements
Students seeking the Doctor of Philosophy degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Department of Criminal Justice.

1. Complete a minimum of 60 credit hours beyond the master’s degree.
2. Complete 9 semester hours of criminological theory and 15 semester hours of doctoral level research methods/analysis.
3. Complete an additional 18 credit hours of electives of which:
   a. A minimum of 9 elective credits must be taken in criminal justice courses from the approved lists and not previously taken for graduate credit and,
   b. Up to 9 elective credits, not previously taken for graduate credit, may be selected from any courses approved by the student’s advisory committee and offered for graduate credit at either the University of North Dakota or Minot State University.
4. Complete comprehensive examination in criminological theory and research methods/analysis prior to submission and approval of the dissertation prospectus.
5. Complete an examination in one area of specialization (to be determined in consultation with the student’s advisory committee).
7. Successfully defend a dissertation.

Required Curriculum:

**Theory**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CJ 510</td>
<td>Historical Perspectives in Criminology (UND)</td>
<td>3</td>
</tr>
<tr>
<td>CJ 511</td>
<td>Contemporary Perspectives in Criminology (UND)</td>
<td>3</td>
</tr>
<tr>
<td>CJ 515</td>
<td>Human Nature and Crime (UND)</td>
<td>3</td>
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</tbody>
</table>

**Methods**

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<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CJ 520</td>
<td>Topics in Research Methods (UND)</td>
<td>3</td>
</tr>
<tr>
<td>CJ 522</td>
<td>Qualitative Research Methods in Criminal Justice (UND)</td>
<td>3</td>
</tr>
<tr>
<td>CJ 525</td>
<td>Advanced Quantitative Methods/Analysis (UND)</td>
<td>3</td>
</tr>
<tr>
<td>CJ 526</td>
<td>Special Topics in Quantitative Analysis (UND)</td>
<td>3</td>
</tr>
<tr>
<td>CJ 690</td>
<td>(MiSU)</td>
<td>3</td>
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**Electives (18 Credits, 9 of which must be from the following list)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CJ 535</td>
<td>Seminar in Juvenile Justice (UND)</td>
<td>3</td>
</tr>
<tr>
<td>or CJ 635</td>
<td>(MiSU)</td>
<td></td>
</tr>
<tr>
<td>CJ 540</td>
<td>Seminar in Criminal Justice Policy (UND)</td>
<td>3</td>
</tr>
<tr>
<td>or CJ 640</td>
<td>(MiSU)</td>
<td></td>
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</tbody>
</table>

J.D./PH.D. Specialization

Option 1: Students who have successfully completed all requirements from an ABA accredited law school and have been awarded a Juris Doctorate (J.D.) degree may complete the Ph.D. in Criminal Justice through meeting the Theory and Methods/Statistics requirements of the doctoral program, successfully passing the comprehensive examination, and successfully defending a dissertation.

Option 2: Students currently enrolled in an ABA accredited law school may also complete requirements for the J.D./Ph.D. option. These students must successfully complete the Theory and Methods/Statistics components of the doctoral program, the comprehensive examination, and defend a dissertation. Students on this track must receive their J.D. prior to or coincident with receipt of their Ph.D.

Earth System Science and Policy

M.S. in Earth System Science and Policy (p. 381)

Master of Environmental Management (M.E.M) (p. 380)

Ph.D. in Earth System Science and Policy (p. 380)

Courses

**ESSP 501. Earth System Science and Policy I. 5 Credits.**
An overview of the fundamental issues from five research areas: Biodiversity and Ecosystem Functioning; Climate and Environmental Change; Land and Resource Management; Environmental Policy, Management, and Communication; and Human Health and the Environment. Material will be presented "situationally" in a problem-based learning environment. ESSP faculty and guest lecturers will present background information relevant to the topics. Students are expected to engage actively in the learning process by 1) determining what further information they need to understand the problem, 2) researching the questions, 3) clearly and concisely presenting the findings of their research to one another. Prerequisites: Graduate standing in ESSP. Corequisites: ESSP 501R and ESSL 501L.

**ESSP 501L. Earth System Science and Policy Laboratory I. 2 Credits.**
Laboratory session. Will require one or more full day field trips; may require one or more weekend field trips. Prerequisites: Graduate standing in ESSP. Corequisites: ESSP 501 and ESSL 501R. S/U grading.

**ESSP 501R. Earth System Science and Policy Recitation. 3 Credits.**
Small group discussions to include many parties to an environmental issue. Prerequisites: Graduate standing in ESSP. Corequisites: ESSP 501 and ESSL 501L. S/U grading.
ESSP 502. Earth System Science and Policy II. 5 Credits.
Course follows the design of ESSP 501 but with more emphasis on written reports and team projects. At the beginning of the semester, students will either select or be assigned a topic for an interdisciplinary team project for completion by the end of the semester. The team project helps students acquire an interdisciplinary outlook, and fosters communication and cooperation within a positive multi-disciplinary work environment. This will provide students with skills that are integral to the management of complex environmental problems they will face in the world beyond academia. Prerequisites: ESSP 501, 501R and 501L. Corequisites: ESSP 502R and ESSP 502L.

ESSP 502L. Earth System Science and Policy Laboratory II. 2 Credits.

ESSP 502R. Earth System Science and Policy Recitation II. 3 Credits.

ESSP 503. Environmental Policy & Science. 3 Credits.
Human interactions with the Earth system are often managed through policy and science. This course will introduce students to concepts, ideas, practices, and challenges at the nexus of policy, science, and the environment. Students will examine the human dimensions of environmental problems and the different roles of policy and science in helping us address them. F.

ESSP 504. The Biosphere. 3 Credits.
The Biosphere (ESSP 504) introduces students to the concept of the biosphere as articulated by Vladimir Vernadsky in the 1920s and 1930s, and examines the concepts and roles of nutrient cycling, biodiversity, evolution, ecology, and ecosystem productivity on Earth. The overall course is framed around the Drake equation and walks students through critical steps in the formation of the solar system, habitable zones around stars, evolution and proliferation of life on Earth, the interconnected nature of inorganic nutrient cycling and ecosystem function, and human's impact on all these systems, culminating with the final variable of the Drake equation—the longevity of civilizations—and humanity's active role in the Anthropocene. F.

ESSP 505. Energy Issues and Earth Systems. 3 Credits.
This course is about contemporary complex energy issues. It gives an overview of energy history, the last century trends and the achievement in energy production. It also discusses energy systems and energy “linkages” with society. It then examines the pros and the cons of both fossil fuels and alternative fuels. Finally it considers the future of energy in low-carbon energy systems. F.

ESSP 506. Ecosystem Services: Valuing Nature in a Market Society. 3 Credits.
Analyzes the services and goods provided by natural and human-made ecosystems with a primary focus on the agroecosystems and grasslands of the northern Great Plains. Explores the scientific framework of ecosystem services, their disruption or disturbance, economic and ecological values, methods of analyzing these values, and policy implications. S.

ESSP 507. Earth Systems Processes and Vulnerability Analysis. 3 Credits.
Earth Systems Processes and Vulnerability Analysis (ESSP 507) will explore how humans exist on an active landscape. The course focuses on an understanding of the integration of the processes of physical Earth systems and the human vulnerability to hazards and Earth system syndromes related to these processes. The course also explores human vulnerability by analyzing spatial, numerical, and historical data, through spatial and statistical techniques. S.

ESSP 508. Hydrological Cycle in Earth Systems. 3 Credits.
Hydrological Cycle in Earth Systems (ESSP 508) will introduce the processes of the hydrological cycle in the Earth system. The course focuses on an understanding of fundamental chemical and physical properties of water and processes of water movement within the Earth system through physical, biological and human controls. The course also aims to help students develop an understanding of how the hydrological cycle interacts and affects the energy balance and biogeochemical cycle in the Earth system. S.

ESSP 509. Colloquium Series. 1 Credit.
Speaker series and student led discussions on interdisciplinary topics and research related to the graduate core courses in ESSP. Prerequisite: Consent of Instructor. S/U grading. F.S.

ESSP 594. Directed Study. 1-5 Credits.
Directed reading or investigations tailored to the needs of individual students for advanced knowledge in specific areas. Typically requires weekly meetings with the assigned faculty member. Usually culminates in a paper on the specific topical area. Doctoral candidates may repeat once. Prerequisite: Permission of an ESSP faculty member who agrees to serve as supervisor. Repeatable to 10 credits.

ESSP 596. Doctoral Research. 1-9 Credits.
Arranged with student's advisory committee. May be repeated for credit. Prerequisite: Graduate standing in ESSP or consent of instructor. Repeatable. S/U grading. F.S,SS.

ESSP 597. Internship. 3-9 Credits.
Practical experience for ESSP students in a professional environment. Repeatable to 9 credits. Prerequisite: Graduate standing in ESSP. Repeatable to 9 credits. S/U grading.
ESSP 599. Special Topics. 1-6 Credits.
Topics of current interest. May be provided by program or visiting ESSP faculty. May be repeated for credit. Prerequisite: Graduate standing in ESSP or consent of instructor. Repeatable.

ESSP 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

ESSP 997. Independent Study. 2 Credits.
Independent study and preparation of written and oral reports describing internships. Prerequisite: Approval by student’s advisor of written proposal describing internship to be completed.

ESSP 998. Thesis. 3-9 Credits.
Academic credit for thesis research that has been approved in advance by a student’s advisory committee. May be repeated but no more than 9 credits will be allowed in a master’s degree program. Prerequisite: Graduate standing in ESSP or consent of instructor. Repeatable to 9 credits.

ESSP 999. Dissertation. 3-18 Credits.
Academic credit for doctoral dissertation research that has been approved in advance by the student’s advisory committee. May be repeated but no more than 18 credits will be allowed in the degree program. Prerequisite: Consent of instructor. Repeatable to 18 credits.

Doctor of Philosophy in Earth System Science and Policy

Admission Requirements
 Applicants who are seeking admission to School of Graduate Studies must meet all of the minimum general education requirements identified in the graduate catalog. In addition, students must fulfill the requirements below for admission to Earth System Science and Policy Ph.D. degree program.

1. Hold a Master’s degree from a recognized college or university.
2. Have satisfactorily completed a minimum of college-level algebra plus 3 credits of college statistics or calculus, AND a minimum of 12 semester credit hours in natural or physical sciences, e.g., physics, chemistry, geosciences, biology or related sciences, AND 6 semester credits in social sciences, e.g., economics, geography, environmental studies, sociology, psychology, anthropology, archeology, political science or related fields.
3. Have earned a minimum average GPA of 3.50 on a 4.00 scale on all graduate-level coursework.
4. Submit score for the Graduate Record Examination (GRE) General Test.
5. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

Degree Requirements
 Students seeking the Doctorate degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Earth System Science and Policy Department.

The overarching goal of all the degree programs offered in Earth System Science and Policy is to facilitate the acquisition of skills required to solve environmental problems or to seize opportunities presented by a changing environment. Much of the responsibility for learning rests upon the student.

1. Students enrolled in the PhD program will take (in most cases) the following sequences. Students will complete the basic two-semester core sequence of courses during their first year of study.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESSP 503</td>
<td>Environmental Policy &amp; Science</td>
<td>3</td>
</tr>
<tr>
<td>ESSP 504</td>
<td>The Biosphere</td>
<td>3</td>
</tr>
<tr>
<td>ESSP 505</td>
<td>Energy Issues and Earth Systems</td>
<td>3</td>
</tr>
<tr>
<td>ESSP 506</td>
<td>Ecosystem Services: Valuing Nature in a Market Society</td>
<td>3</td>
</tr>
<tr>
<td>ESSP 507</td>
<td>Earth Systems Processes and Vulnerability Analysis</td>
<td>3</td>
</tr>
<tr>
<td>ESSP 508</td>
<td>Hydrological Cycle in Earth Systems</td>
<td>3</td>
</tr>
<tr>
<td>ESSP 590</td>
<td>Colloquium Series</td>
<td>2</td>
</tr>
</tbody>
</table>

2. A minimum of 90 credits (30 of which must be taken in the Earth System Science and Policy Program) beyond the baccalaureate, including acceptable master’s degree work, and up to 18 credits for dissertation is required for the PhD degree.
3. PhD students will be required to spend a minimum of two semesters, full-time, on the UND campus after receiving a master’s degree.
4. Students must complete at least 6 credits of approved academic work per year.
5. By the end of the second semester in the doctoral program, the student will select a chair of her/his Advisory Committee. By the end of the third semester, the student will select membership of the Advisory Committee, in consultation with the chair. The Advisory Committee will have at least five members, at least three of which must be from the ESSP faculty. One of the committee members will be appointed by the Dean of the School of Graduate Studies. That member will be from outside the ESSP Department. The committee will assist the student in course selection and definition of a research topic and will also administer and evaluate all examinations that are required for completion of the degree.
6. ESSP PhD students must file with the School of Graduate Studies an approved program of study by the end of their third semester.
7. Students must maintain a GPA of at least 3.00 from the start of the Ph.D. program in ESSP, with no grades below “B” and comply with the requirements of the School of Graduate Studies. Any student whose GPA falls below 3.00 will be placed on probation and will have one semester to raise the GPA to 3.00 or above.
8. All students must take a qualifying exam to advance to candidacy in the PhD program. Part of the written requirement requires all students to write a dissertation proposal in a style appropriate for submission to a funding organization or agency. Students will present their proposal for review no later than two years from the date of admission to the ESSP doctoral program. To be advanced to candidacy the PhD student will also take a qualifying exam, which will be administered during the student’s third year. Successful completion, and oral defense, of a dissertation is also required for the PhD degree.
9. All exams will be administered and evaluated by the student’s Advisory Committee.

Master of Environmental Management

Admission Requirements
 Applicants who are seeking admission to School of Graduate Studies must meet all the minimum general education requirements identified in the graduate catalog. In addition students must fulfill the requirements below for admission to Earth System Science and Policy M.E.M. degree program.

1. Hold a Bachelor’s degree from an accredited college or university.
2. Have satisfactorily completed a minimum of college-level algebra plus 3 credits of college statistics or calculus.
3. Have completed a minimum of 6 semester credit hours in natural sciences and 6 semester credits in social sciences, e.g., economics, sociology, psychology, political science, anthropology/archeology, or related fields.
4. Have earned a minimum average GPA of 3.00 on a 4.00 scale, on all upper division college-level coursework.
5. Submit score from the Graduate Record Examination (GRE) General Test.
6. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

Degree Requirements

Students seeking the Master of Environmental Management degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Earth System Science and Policy Department.

The overarching goal of all the degree programs offered in Earth System Science and Policy is to facilitate the acquisition of skills required to solve environmental problems or to seize opportunities presented by a changing environment. Much of the responsibility for learning rests upon the student.

1. Students enrolled in the MEM program will take the following sequences. Students will complete the basic two-semester core sequence of courses during their first year of study.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ESSP 503</td>
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<td>3</td>
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<tr>
<td>ESSP 504</td>
<td>The Biosphere</td>
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<tr>
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<td>ESSP 506</td>
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<tr>
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<tr>
<td>ESSP 508</td>
<td>Hydrological Cycle in Earth Systems</td>
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</tr>
<tr>
<td>ESSP 590</td>
<td>Colloquium Series</td>
<td>2</td>
</tr>
</tbody>
</table>

2. A minimum of 36 credits, including three to nine credits for Internship is required.

3. At least one-half of the credits must be at or above the 500 level.

4. A maximum of one-fourth (usually 8-9 semester credits) of the credit hours required for the degree may be transferred from another institution.

5. By the end of the first semester the student will select a chair of her/his Advisory Committee and, in consultation with that chair, recommend membership on the Advisory Committee by the end of the second semester.

6. Students must file with the School of Graduate Studies an approved program of study at the end of the second semester.

7. Students must maintain a GPA of 3.00 from the start of the graduate program in ESSP, and comply with the requirements of the School of Graduate Studies. Grades poorer than “C” will not be accepted as fulfilling degree requirements.

8. Complete written and oral comprehensive examinations to qualify for candidacy in the MEM program. These will occur no later than one month before leaving for the internship and will entail a 5 to 15 page written description and an oral presentation of their intended internship project.

9. In place of a thesis, MEM students must submit a comprehensive written report of their internship with an appropriate organization. The written report will be in the form of an Independent Study Report, following the guidelines and procedures for such a report set by the School of Graduate Studies. Students shall make a final oral presentation to an audience from the ESSP program, stakeholders affected by their project, and relevant professionals. Students shall provide the ESSP internship evaluation form completed and signed by their internship advisor.

10. All exams will be administered and evaluated by the student’s Advisory Committee.

<table>
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<td>ESSP 590</td>
<td>Colloquium Series</td>
<td>2</td>
</tr>
<tr>
<td>Electives</td>
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<td>5-11</td>
</tr>
<tr>
<td>ESSP 597</td>
<td>Internship</td>
<td>3-9</td>
</tr>
<tr>
<td>ESSP 997</td>
<td>Independent Study</td>
<td>2</td>
</tr>
</tbody>
</table>

Total Credits: 30-42

Master of Science in Earth System Science and Policy

Admission Requirements

Applicants who are seeking admission to School of Graduate Studies must meet all of the minimum general education requirements identified in the graduate catalog. In addition, students must fulfill the requirements below for admission to Earth System Science and Policy M.S. degree program.

1. Hold a bachelor’s degree from an accredited college or university.
2. Have satisfactorily completed a minimum of college-level algebra plus 3 credits of college statistics or calculus.
3. Have completed a minimum of 12 semester credits in the natural or physical sciences, e.g., physics, chemistry, geosciences, biology or related sciences.
4. Have earned a minimum average GPA of 3.00 on a 4.00 scale, on all upper division college-level coursework.
5. Submit score from the Graduate Record Examination (GRE) General Test.
6. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

Degree Requirements

Students seeking the Master of Science degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Earth System Science and Policy Department.

The overarching goal of all the degree programs offered in Earth System Science and Policy is to facilitate the acquisition of skills required to solve environmental problems or to seize opportunities presented by a changing environment. Much of the responsibility for learning rests upon the student.

1. Students enrolled in the MS program will take the following sequences. Students will complete the basic two-semester core sequences of courses during their first year of study.

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</table>

2. A minimum of 36 credits beyond the baccalaureate is required, including six to nine credits for thesis.

3. At least one-half of the credits must be at or above the 500 level.

4. A maximum of one-fourth (usually 8-9 semester credits) of the credit hours required for the degree may be transferred from another institution.

5. By the end of the first semester the student will select a chair of her/his Advisory Committee and, in consultation with that chair, recommend membership on the Advisory Committee by the end of the second semester.

6. Students must maintain a GPA of 3.00 from the start of the graduate program in ESSP, and comply with the requirements of the School of Graduate Studies before the completion of fifteen credits of coursework. The Advisory Committee will have 3 members, at least two of whom must be from the ESSP faculty. If the student is pursuing a minor concurrently with the MS in ESSP, one of the committee members will be from the department of the minor.

7. Students must maintain a GPA of 3.00 from the start of the graduate program in ESSP, and comply with the requirements of the School of Graduate Studies. Grades poorer than “C” will not be accepted as fulfilling degree requirements.

8. MS students must complete oral and written examinations to qualify for candidacy in the Master of Science program. These will occur no later than the end of the third semester of coursework and will entail a 15 to 30 page written description and an oral presentation of their intended research project.
Successful completion, and oral defense, of a thesis is required for the MS degree.

All exams will be administered and evaluated by the student’s Advisory Committee.

ESSP 503  Environmental Policy & Science  3
ESSP 504  The Biosphere  3
ESSP 505  Energy Issues and Earth Systems  3
ESSP 506  Ecosystem Services: Valuing Nature in a Market Society  3
ESSP 507  Earth Systems Processes and Vulnerability Analysis  3
ESSP 508  Hydrological Cycle in Earth Systems  3
ESSP 590  Colloquium Series  2
Electives  7-13
ESSP 998  Thesis  4-9
Total Credits  31-42

Economics (Applied)

M.S. in Applied Economics (M.S.A.E.) (p. 383)


Courses

ECON 503. Government and Business. 3 Credits.

ECON 504. Microeconomic Theory & Applications. 3 Credits.

ECON 505. Macroeconomic Theory & Applications. 3 Credits.

ECON 506. Econometrics. 3 Credits.

ECON 507. Advanced Managerial Economics. 3 Credits.

ECON 508. Hydrological Cycle in Earth Systems  3

ECON 509. Macroeconomic Decision Making. 3 Credits.

ECON 510. Time Series Methods & Applications. 3 Credits.

ECON 524. Advanced International Economics. 3 Credits.

ECON 534. Further Topics in Econometrics. 3 Credits.

ECON 545. Quantitative Methods for Impact Evaluation & Causal Inference. 3 Credits.

ECON 555. Demographic Methods for Economics. 3 Credits.

ECON 556. Economic Development: Global, National, and Regional Issues. 3 Credits.

ECON 557. Advanced Special Topics. 1-3 Credits.

ECON 580. Economic Development: Global, National, and Regional Issues. 3 Credits.

ECON 592. Research in Economics. 2-3 Credits.

ECON 595. Further Topics in Econometrics. 3 Credits.

ECON 597. Economic Research Internship. 1-3 Credits.

ECON 598. Thesis. 4 Credits.

The thesis is an original research project completed under the supervision of a thesis committee.
Undergraduate Courses for Graduate Credit

ECON 324. Public Finance. 3 Credits.
Growth and effects of the public sector of the economy. Prerequisites: ECON 201 and ECON 202.

ECON 338. International Economics. 3 Credits.
Economic basis for gain in international trade; capital and population movements; international disequilibrium and the process of balance-of-payments adjustments; tariffs, underdeveloped countries. Prerequisites: ECON 201 and ECON 202. F.S.

ECON 341. Labor Economics and Labor Relations. 3 Credits.
A survey of the nature and causes of the economic problems of the American wage and salary earner and of the attempts of wage earners and society, through organizations and legislation, to alleviate these problems. The course comparatively surveys the history and systematic theories of labor movements and the market and institutional influences on wages and employment. Particular emphasis will be placed on the law of industrial relations, employment and income access, and the adjustment of labor disputes. Prerequisites: ECON 201 and ECON 202. F.

ECON 400. History of Economic Thought. 3 Credits.
Broad overview of the major schools of thought including Mercantilist, Physiocrat, Classical, Marxian, Socialist, Historical, Austrian, Neoclassical, Institutional, Keynesian, and Monetarist. The coverage includes value theory, income/expenditure theory, growth/development theory, scientific method, scope and public policy. Prerequisites: ECON 105 or ECON 201, and ECON 202. S.

ECON 410. Empirical Methods in Economics I. 3 Credits.
This course is an introduction to econometrics, the joint area of economics and statistics dealing with the application of statistics to economic problems. The course objectives are to acquire a basic understanding of the theory and methods of econometrics and to gain practical experience in utilizing these methods. The students will use the tools developed in the course in homework and written assignments so that they can develop an insight to theory and its application. Prerequisites: ECON 201, ECON 202 and ECON 210. F.

ECON 411. Economic Forecasting. 3 Credits.
An introduction to Economics Forecasting and Time Series Analysis. The course will cover specifications and estimation of ARMA models, seasonality, non-stationary, unit roots and forecast evaluations. Empirical applications are used throughout the course. Prerequisite or Corequisite: ECON 410 or ECON 506. S.

ECON 416. Mathematics for Economists. 3 Credits.
Study of mathematical methods in the areas of introductory calculus and linear algebra, and their application to economic analysis. Mathematical analysis of static and dynamic equilibrium models, growth models, distribution, production functions, cycles, activity analysis, mathematical programming, and model building. Prerequisite: MATH 146 or MATH 165. Prerequisite or Corequisites: ECON 308. F.

ECON 438. International Money and Finance. 3 Credits.
Identification of key international financial concepts and analysis of their relationships in the international money and capital markets; determination of the balance of payments and exchange rates; and examination of alternative organizations of the international monetary system. Prerequisite: ECON 303. F.

Master of Science in Applied Economics

Admission Requirements

1. A four-year bachelor's degree from a recognized college or university.
2. An overall undergraduate grade point average of 2.75 or greater for all undergraduate work or a GPA of at least 3.0 for the junior and senior years of undergraduate work (based on A=4.0).
3. Official scores from the Graduate Record Examination (GRE) General Test or Graduate Management Admission Test (GMAT). Students with strong quantitative backgrounds, including current and former UND undergraduate STEM majors, or, students holding a graduate degree in a business or STEM related field from an AACSB accredited institution, may request a waiver of the GRE/GMAT requirement.
4. Satisfy the School of Graduate Studies' English Language Proficiency requirements as published in the graduate catalog.
5. Complete undergraduate intermediate microeconomics, one semester of calculus, and one semester of probability and statistics, or equivalent.
6. Applicants may be eligible for admission in “Provisional” status with six credits of requisite undergraduate work provided that they meet all other stated admission criteria. In such cases, the student must satisfy all conditions in her/his admission letter in order to advance to “Approved” status. Failure to address the conditions of admission as stated in the admission letter will be viewed as unsatisfactory progress and could result in dismissal from the School of Graduate Studies.

Combined BS/MSAE Option: A combined BS/MSAE option is available to outstanding undergraduates who have completed 90 semester hours in a bachelor’s program at UND.

ECON 416 Mathematics for Economists and ECON 411 Economic Forecasting are the two courses that students in the combined program are permitted to count toward both a UND bachelor’s degree and the MSAE degree, but only if these courses are declared for graduate credit. All other courses taken for credit in the combined program must satisfy only bachelor’s program requirements, or only MSAE program requirements.

Interested students should consult with the MSAE Program Director.

Accelerated Bachelor/Masters (ABM) 5-Year Degree Option: The ABM degree program allows exceptional undergraduate students at UND an opportunity to complete the requirements for both the bachelor’s and master’s degrees at an accelerated pace. Undergraduates in both the BBA in Business Economics and the BA in Economics are eligible for consideration for the ABM. All requirements for both the undergraduate and MSAE degrees must be met, and these students may double count up to 12 graduate-level credits towards the requirements for their undergraduate degree and their MSAE degree requirements. ABM students must obtain their MSAE degree within 12 months of completing their undergraduate degree, provided that the degree requirements can be completed in that timeframe.

Admission to the ABM is a competitive process. The following are minimum eligibility requirements:

1. Students must meet the School of Graduate Studies admissions eligibility requirements.
2. Students must have completed a minimum of 60 credits, including credits earned from advanced placement and dual credit. Students must apply before completion of the undergraduate degree.
3. Transfer students with a minimum of 60 credits-whether from the transfer institution alone or in combination with UND credits-must have a minimum cumulative GPA of 3.0/4.0 at the time of admission to the ABM program.
4. Students must have a minimum cumulative GPA of 3.0/4.0 at UND at the time of admission into the ABM program.
5. ABM program applicants must submit the standard application to the School of Graduate Studies, the application fee, a personal statement, and transcripts. ABM program applicants do not need to take the GRE/GMAT.
6. Additionally, ABM program applicants must submit a detailed Program of Study that describes the 12 credits of double counted courses, the courses that will be taken after being accepted into the MSAE program, the courses that will be taken before graduation from either of the eligible undergraduate programs, and the expected graduation date for each degree. The submitted program of study must be signed by the student, the student's undergraduate advisor, the student's graduate advisor, and the MSAE Program Director.
**Degree Requirements**

Students seeking the Master of Science in Applied Economics degree through the Department of Economics & Finance at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Department of Economics & Finance.

The minimum number of credits for completing the MSAE is 30 credits. The MSAE curriculum consists of (i) an Economics Core, (ii) a set of Data Analytics courses, (iii) an Independent Study, and, (iv) a minimum of one 3-credit elective. The Independent Study serves as a capstone for the program and allows students to demonstrate their command of the methods and perspectives taught in the program in investigating a substantive problem. The program is designed to be completed within two academic years (5 semesters).

**Economics Core (12 credit hours)**

<table>
<thead>
<tr>
<th>Course</th>
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<th>Credits</th>
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<tbody>
<tr>
<td>ECON 416</td>
<td>Mathematics for Economists</td>
<td>3</td>
</tr>
<tr>
<td>ECON 504</td>
<td>Microeconomic Theory &amp; Applications</td>
<td>3</td>
</tr>
<tr>
<td>ECON 505</td>
<td>Macroeconomic Theory &amp; Applications</td>
<td>3</td>
</tr>
<tr>
<td>ECON 506</td>
<td>Econometrics (Econometrics)</td>
<td>3</td>
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<tr>
<td><strong>Total Credits</strong></td>
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<td><strong>12</strong></td>
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**Data Analytics (12 credit hours)**

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<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ECON 510</td>
<td>Time Series Methods &amp; Applications</td>
<td>3</td>
</tr>
<tr>
<td>ECON 534</td>
<td>Further Topics in Econometrics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 545</td>
<td>Quantitative Methods for Impact Evaluation &amp; Causal Inference</td>
<td>3</td>
</tr>
<tr>
<td>ECON 411</td>
<td>Economic Forecasting</td>
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<tr>
<td><strong>Total Credits</strong></td>
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<td><strong>12</strong></td>
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**Independent Study (3 credit hours)**

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<tr>
<th>Course</th>
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<tbody>
<tr>
<td>ECON 997</td>
<td>Independent Study</td>
<td>3</td>
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<tr>
<td><strong>Total Credits</strong></td>
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<td><strong>12</strong></td>
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**Electives (minimum of 3 credit hours)**

<table>
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<tr>
<th>Course</th>
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<tbody>
<tr>
<td>ECON 438</td>
<td>International Money and Finance</td>
<td>3</td>
</tr>
<tr>
<td>ECON 503</td>
<td>Government and Business</td>
<td>3</td>
</tr>
<tr>
<td>ECON 524</td>
<td>Advanced International Economics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 565</td>
<td>Demographic Methods for Economics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 575</td>
<td>Advanced Special Topics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 597</td>
<td>Economic Research Internship</td>
<td>3</td>
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</tbody>
</table>

*Examples shown; offerings may vary from semester to semester. Choices of cognate electives must be determined in consultation with and approved by the MSAE program director. Courses previously taken from UND for undergraduate credit may not be used to satisfy MSAE requirements.

**Education**

Educational Foundations and Research (p. 384)

Educational Leadership

Teaching and Learning (p. 392)

Curriculum and Instruction (p. 397)

Early Childhood Education

Elementary Education

English Language Learners

Higher Education

Instructional Design and Technology

Reading Education

Special Education (p. 423)

**Educational Foundations and Research**

M.S. in Educational Studies (p. 387)

Ph.D. in Educational Foundations and Research (p. 386)

Certificate in Learning Analytics (p. 386)

Certificate in Quantitative Research Methods (p. 386)

**Courses**

**EFR 500. Introduction to the Foundations of Education. 3 Credits.**

A problem-centered class dialogue on those philosophical, social, political and historical concepts of educational thought that have shaped the development of the learning experience. F,S,SS.

**EFR 501. Psychological Foundations of Education. 3 Credits.**

A study of the learning process with secondary emphasis on how the learning process is affected by individual differences, growth and development, and personality. A background in undergraduate Educational Psychology is assumed. Both theories of learning and theories of instruction are considered. Prerequisites: EFR 500 or consent of instructor.

**EFR 502. Issues and Trends in Education. 3 Credits.**

Examination of contemporary issues of pre-K-12 and higher education and some of the philosophical, political, social, and historical foundations which influence their development. Students will engage in public scholarship through issue advocacy projects. Prerequisites: EFR 500 or consent of instructor. On demand.

**EFR 503. Historical Foundations of Education. 3 Credits.**

An historical examination of the concepts of the meaning, nature, process, and purposes of education as evolved in different historical periods and social contexts with emphasis on the learners, ideas and changing institutions. Prerequisites: EFR 500 or consent of instructor.

**EFR 504. Philosophical Foundations of Education. 3 Credits.**

A study of the representative schools of thought which have structured major philosophies of education. Prerequisites: EFR 500 or consent of instructor.

**EFR 505. Sociological Foundations of Education. 3 Credits.**

The study of individuals, schools and education in their social contexts such as community, polity, equity, race, class, gender, and social reproduction. Focuses on the development of the field, its theories, and applications for educators. Prerequisites: EFR 500 or consent of instructor. On demand.

**EFR 506. Multicultural Education. 3 Credits.**

A review of the conceptual, historical and theoretical aspects of multicultural education. A major goal will be to provide educators with processes for incorporating multicultural education into educational environments; to meet the needs of culturally diverse students and to increase the cultural awareness and sensitivity of all students. North Dakota/Native American issues are primary elements of this course. Prerequisites: EFR 500 or consent of instructor.

**EFR 507. Gender, Sexuality and Education. 3 Credits.**

A critical feminist analysis of the history, philosophy, theory, curriculum, and practice of education. The roles of educators, students, society, biology, and policy are considered in the education of those of diverse sexes, genders and sexualities. Prerequisites: EFR 500 or consent of instructor.

**EFR 508. Anthropological Foundations of Education. 3 Credits.**

Students will examine the convergence of anthropology and education through an analysis of education as cultural transmission and a review of enculturation and acculturation processes in traditional and modern societies. Prerequisites: EFR 500 or consent of instructor.

**EFR 509. Introduction to Applied Educational Research. 3 Credits.**

An introduction to applied research methodologies used to study education. The course covers quantitative as well as qualitative types of research. The paradigms of both types of research will be contrasted and the application of the methodologies in actual research investigated. F,S,SS.
EFR 510. Qualitative Research Methods. 3 Credits.
Qualitative research methods are naturalistic and contextual. The methodology derives from Anthropology and other social sciences, and seeks to understand human behavior from the actors’ perspective. Students are to learn the fundamental data collection methods: observation, participant observation, and interviewing, as well as data analysis through coding and categorizing.

EFR 511. Program Evaluation. 3 Credits.
An interdisciplinary course which studies the theoretical models of program evaluation as well as professional standards. Emphasis is on the analysis of models for implementation and application in various social and public policy fields, as well as education. S.

EFR 512. Survey and Test Design. 3 Credits.
An introduction to designing surveys for social science research and tests in educational settings. Students gain theory and skills in construction, data collection, and evaluation of surveys and educational tests. S, even years.

EFR 513. Large Dataset Management and Analysis. 3 Credits.
A study of educational and social science statistics involving gathering, managing, manipulation and analysis of large data sets, both local and national, using SPSS and/or SAS. Prerequisite or Corequisite: EFR 515 or consent of instructor. On demand.

EFR 514. Discourse Analysis. 3 Credits.
Discourse analysis is a research methodology used to analyze naturally occurring language use, whether in writing or in speech. It draws from and is practiced in many social science and humanities disciplines related to the foundations of education, including linguistics, sociology, anthropology, communications, and cognitive and social psychology. This course will provide students with the building blocks of performing discourse analysis, including instruction in its philosophical foundations, its practices, and its implications.

EFR 515. Statistics I. 3 Credits.
An introduction to basic statistical methods, focusing primarily on descriptive statistics and inferential statistics up to and including two-way analysis of variance.

EFR 516. Statistics II. 3 Credits.
An in-depth study of inferential statistics with primary emphasis on analysis of variance models, multiple regression techniques, analysis of covariance and other higher-order statistical procedures. Prerequisites: EFR 515 or consent of instructor. S, SS.

EFR 517. Advanced Research Methodologies. 3 Credits.
Both qualitative and quantitative aspects of research are considered for a variety of topics, including ethics in research, use of data banks, Q-methodology, survey research, Bayesian concepts, critical theory, longitudinal research and research consultation. Comprehensive examinations in educational research are addressed. This is a capstone course in educational research. Previous or concurrent involvement in research is highly desirable. Available for doctoral level students only.

EFR 518. Multivariate Analysis. 3 Credits.
Multiple regression in generalized problem solving; discriminant analysis, factor analysis, multivariate analysis, canonical analysis, and multivariate analysis of covariance. Students are encouraged to analyze their own data including student-generated computer applications.

EFR 519. Research Seminar. 1-4 Credits.
Experimental Design—An in-depth treatment of analysis of variance designs including factorial designs, treatment by subjects designs, groups within treatment designs, latin squares, higher dimensional designs, mixed effect designs, analysis of covariance, and trend analysis. Emphasis is placed on underlying linear models. Other seminars are held on specific research topics, particularly research proposals. May be repeated. Repeatable.

EFR 520. Advanced Qualitative Research Methods. 3 Credits.
Advanced Qualitative Research Methods will engage students in more in-depth and complex theoretical and practical issues associated with the methodology. Students will conduct mini-research studies and examine qualitative studies conducted by others. Knowledge about IRB requirements will also be addressed. Prerequisites: EFR 510 or consent of instructor.

EFR 522. Mixed-Methods Research. 3 Credits.
Mixed-methods research is the practice of combining quantitative and qualitative analysis within a single study. Students will learn the history and conceptual underpinnings of this methodological practice, read exemplary empirical studies that use mixed-methods, and explore the major mixed-methods designs. To apply these understandings, students will conduct a mixed-methods study on a topic of their own interests. Prerequisites: EFR 510 and EFR 516, or consent of instructor. S.

EFR 523. Structural Equation Modeling. 3 Credits.
This course builds from analyses underpinning structural equation modeling (SEM), such as reliability, exploratory factor analysis, and multiple regression, to SEM topics including path analysis, model specification and identification, goodness of fit, confirmatory factor analysis, structural models, mediation, multiple group invariance testing, and more. To apply these lessons, students will gain skills using SEM software. Prerequisite: EFR 516 or permission of the instructor. On demand.

EFR 524. Needs Assessment. 3 Credits.
Needs assessment is a common evaluation method. This interdisciplinary course will study the concept of needs as well as the processes and techniques of conducting needs assessment. A set of techniques for implementation and application of needs assessment in various community, education, social work, public health, business/industry settings, government, and non-profit agencies will be reviewed. F.

EFR 525. International and Comparative Education. 3 Credits.
An overview of the major issues, concepts and methods of comparative and international education. Focuses on the development of the field, the uses of comparison, the impact of globalization, and policy and practice development around the world at all levels of education. Prerequisites: EFR 500 or consent of instructor.

EFR 530. Learning Analytics. 3 Credits.
Learning analytics is the collection, management, analysis, and reporting of meaningful patterns in data about learners, aimed at optimizing learning and the environments in which it occurs. This course will provide students with the building blocks of learning analytics, including history, concepts and theories, question development, common data sources, tools and techniques, challenges, ethics, applications, case studies, and presenting to educational audiences for decision-making. F, even years.

EFR 535. Data Analytics and Visualization with R. 3 Credits.
R is an increasingly popular, open-source programming language with powerful packages for data analytics and visualization. In this course, students will first master the fundamentals of R, including installation, programing techniques, reading data files, and basic statistics. The fundamentals of data visualization will then be covered, such as theory, applications, and examples. Finally, students will develop skills in data visualization techniques using R packages. Prerequisite or Corequisite: EFR 515 or equivalent. S, even years.

EFR 584. Internship in Educational Research. 1-8 Credits.
Practical experience in the conduct of educational research, analyzing data, and writing reports. Available for doctoral level students only. May be repeated. Prerequisites: Appropriate coursework in educational research and consent of the adviser and department chair. Repeatable.

EFR 590. Special Topics in Education. 1-4 Credits.
Exploration of special topics in the study of education not regularly included in available course offerings. May be repeated for different topics. Prerequisite: Consent of instructor or advisor. Repeatable.

EFR 591. Readings in Education. 1-4 Credits.
Designed primarily for advanced graduate students. May be repeated for different topics. Prerequisite: Consent of instructor or advisor. Repeatable.

EFR 592. Individual Research in Education. 1-4 Credits.
May be repeated. Prerequisite: Consent of instructor or advisor. Repeatable.

EFR 995. Scholarly Project. 2 Credits.
The scholarly project demonstrates critical analysis and application of information and experiences gained throughout the program of study. The project allows students to demonstrate scholarly skills in an integrated manner. The scholarly project must be approved by the student's adviser. Prerequisite: Consent of the student's advisor. S/U grading. On demand.

EFR 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.
Certificate in Learning Analytics

**Requirements**

**Required courses:**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>EFR 513</td>
<td>Large Dataset Management and Analysis</td>
<td>3</td>
</tr>
<tr>
<td>EFR 515</td>
<td>Statistics I (prerequisite for EFR 513)</td>
<td>3</td>
</tr>
<tr>
<td>EFR 530</td>
<td>Learning Analytics (prerequisite for EFR 535)</td>
<td>3</td>
</tr>
<tr>
<td>EFR 535</td>
<td>Data Analytics and Visualization with R</td>
<td>3</td>
</tr>
</tbody>
</table>

*Relevant courses offered at UND not listed will be considered and may be included with approval from certificate coordinator.*

Certificate in Quantitative Research Methods

**Education Track:**

For the 12-credit certificate, students are required to take:

<table>
<thead>
<tr>
<th>Course Code</th>
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<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EFR 516</td>
<td>Statistics II</td>
<td>3</td>
</tr>
<tr>
<td>EFR 518</td>
<td>Multivariate Analysis</td>
<td>3</td>
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</table>

And choose two of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EFR 512</td>
<td>Survey and Test Design</td>
<td>3</td>
</tr>
<tr>
<td>EFR 513</td>
<td>Large Dataset Management and Analysis</td>
<td>3</td>
</tr>
<tr>
<td>EFR 517</td>
<td>Advanced Research Methodologies</td>
<td>3</td>
</tr>
<tr>
<td>EFR 522</td>
<td>Mixed-Methods Research</td>
<td>3</td>
</tr>
<tr>
<td>EFR 523</td>
<td>Structural Equation Modeling</td>
<td>3</td>
</tr>
</tbody>
</table>

* Relevant courses offered at UND not listed will be considered and may be included with approval from certificate coordinator*

**Psychology Track:**

For the 12-credit certificate, students are required to take:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>PSYC 541</td>
<td>Advanced Univariate Statistics</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 542</td>
<td>Multivariate Statistics for Psychology</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 543</td>
<td>Experimental Design</td>
<td>3</td>
</tr>
</tbody>
</table>

And choose one of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYC 595</td>
<td>Seminar in Psychology</td>
<td>1-3</td>
</tr>
<tr>
<td>EFR 513</td>
<td>Large Dataset Management and Analysis</td>
<td>3</td>
</tr>
<tr>
<td>EFR 523</td>
<td>Structural Equation Modeling</td>
<td>3</td>
</tr>
</tbody>
</table>

* Relevant courses offered at UND not listed will be considered and may be included with approval from certificate coordinator*

Doctor of Philosophy in Educational Foundations and Research

**Admission Requirements**

Students with a master’s degree in a field unrelated to Education are eligible for admission to the Ph.D. program.

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

Important dates:

For admission in the Fall semester, please send your complete application materials by February 15; you will be advised of our decision by April 15. For admission in the Spring semester, please send your application materials by October 1; you will be advised of our decision by December 1.

International students should be aware that the School of Graduate Studies at the University of North Dakota does not recognize master’s degrees from institutions outside of the United States or Canada. Students must satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

Application materials should include:

1. Transcripts showing a bachelor’s degree from an accredited college or university
2. Transcripts showing a graduate degree from an accredited college or university
3. Graduate GPA of 3.5 and above
4. Three letters of reference
5. An essay that responds to questions provided in the application
6. A resume and a writing sample of 10-15 pages (separate from #5 above). Your writing sample should demonstrate the best of your intellectual abilities and/or creative work.
7. Optional: scores from the GRE exam, the Advanced GRE, or the Miller’s Analogy Test.

**Degree Requirements**

Students seeking the Doctor of Philosophy degree must satisfy all general requirements set forth by the School of Graduate Studies for the Ph.D., as well as the following:

1. A minimum of 90 credit hours beyond the bachelor’s degree
2. With approval of a student’s Faculty Advisory Committee, 30 credits from a master’s degree from an accredited institution will be applied to the doctoral program of study
3. Maintenance of a minimum of 3.0 GPA
4. Educational Foundations credit hours of 21 or 9 (depending on the emphasis)
5. Research Methodologies credit hours of 21 or 12 (depending on the emphasis)
6. A cognate of 12-15 credits (depending on emphasis)
7. A dissertation of 15 credits
8. The following course requirements:

**Foundations of Education Emphasis**

Select seven of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EFR 501</td>
<td>Psychological Foundations of Education</td>
</tr>
<tr>
<td>EFR 502</td>
<td>Issues and Trends in Education</td>
</tr>
<tr>
<td>EFR 503</td>
<td>Historical Foundations of Education</td>
</tr>
<tr>
<td>EFR 504</td>
<td>Philosophical Foundations of Education</td>
</tr>
<tr>
<td>EFR 505</td>
<td>Sociological Foundations of Education</td>
</tr>
<tr>
<td>EFR 506</td>
<td>Multicultural Education</td>
</tr>
<tr>
<td>EFR 507</td>
<td>Gender, Sexuality and Education</td>
</tr>
</tbody>
</table>
EFR 508 Anthropological Foundations of Education
EFR 525 International and Comparative Education
EFR 591 Readings in Education (With advisor approval)

Select four of the following (Research): 12
EFR 510 Qualitative Research Methods
EFR 511 Program Evaluation
EFR 512 Survey and Test Design
EFR 513 Large Dataset Management and Analysis
EFR 514 Discourse Analysis
EFR 516 Statistics II
EFR 517 Advanced Research Methodologies
EFR 518 Multivariate Analysis
EFR 520 Advanced Qualitative Research Methods
EFR 522 Mixed-Methods Research
EFR 523 Structural Equation Modeling
EFR 524 Needs Assessment
EFR 590 Special Topics in Education
EFR 592 Individual Research in Education (With advisor approval)

HIST 501 Methods of Historical Research
Total Credits 33

Research Methodologies Emphasis
Select seven of the following: 21
EFR 510 Qualitative Research Methods
EFR 511 Program Evaluation
EFR 512 Survey and Test Design
EFR 513 Large Dataset Management and Analysis
EFR 514 Discourse Analysis
EFR 516 Statistics II
EFR 517 Advanced Research Methodologies
EFR 518 Multivariate Analysis
EFR 520 Advanced Qualitative Research Methods
EFR 522 Mixed-Methods Research
EFR 523 Structural Equation Modeling
EFR 584 Internship in Educational Research
EFR 590 Special Topics in Education
EFR 592 Individual Research in Education (With advisor approval)

HIST 501 Methods of Historical Research
Total Credits 30

Master of Science in Educational Studies

Admission Requirements
The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. A four-year bachelor’s degree from a recognized college or university
2. Minimum of 8 undergraduate credit hours of social sciences/humanities
3. A cumulative Grade Point Average (GPA) of at least 2.75 for all undergraduate work or a GPA of at least 3.0 for the junior and senior years of undergraduate work (based on A=4.00)
4. Three letters of recommendation that address the academic and professional qualities that support you for graduate work
5. Statement of Goals and Objectives (see below)
6. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

Statement of Goals and Objectives. As part of the application process, the applicant must respond to the following questions:

1. Describe several personal and professional goals you would like to achieve in the next five years. Include in your description reasons why these goals are important to you.
2. What are the characteristics, attitudes, values, and/or skills that you think will make you a good candidate for your professional role?
3. What have you already done professionally or personally of which you are proud? Please include a chronological history of all professional teaching or administration experiences, as well as academic honors or achievements you have earned.

Degree Requirements
A minimum of 32 credits, to include:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EFR 500</td>
<td>Introduction to the Foundations of Education</td>
</tr>
<tr>
<td>EFR 509</td>
<td>Introduction to Applied Educational Research</td>
</tr>
<tr>
<td>EFR 510</td>
<td>Qualitative Research Methods</td>
</tr>
<tr>
<td>EFR 511</td>
<td>Program Evaluation</td>
</tr>
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<td>EFR 512</td>
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<td>EFR 518</td>
<td>Multivariate Analysis</td>
</tr>
<tr>
<td>EFR 520</td>
<td>Advanced Qualitative Research Methods</td>
</tr>
<tr>
<td>EFR 522</td>
<td>Mixed-Methods Research</td>
</tr>
<tr>
<td>EFR 523</td>
<td>Structural Equation Modeling</td>
</tr>
<tr>
<td>EFR 584</td>
<td>Internship in Educational Research</td>
</tr>
<tr>
<td>EFR 590</td>
<td>Special Topics in Education</td>
</tr>
<tr>
<td>EFR 592</td>
<td>Individual Research in Education (With advisor approval)</td>
</tr>
<tr>
<td>HIST 501</td>
<td>Methods of Historical Research</td>
</tr>
</tbody>
</table>

Total Credits 32-34

1. EFR 500 is a prerequisite for all further foundations courses (EFR 501-508, EFR 525).
2. EFR 509 is a prerequisite for all further research methods courses (EFR 510-524).

Required for all students, regardless of thesis or non-thesis:

1. A minimum of 32 credits, including both credits required for the major and credits for the independent study, scholarly project or thesis.
2. At least one-half of the credits must be at or above the 500-level.
3. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.
4. The program may include the major and a non-EFR minor (a single discipline) or the major and a non-EFR cognate area (an interdisciplinary group of courses).

Thesis Option:
1. Four credits for the Thesis (EFR 998)
2. Preparation of a written thesis is approved by a committee of three faculty.
   The student’s advisor chairs the committee.
3. Presentation and defense of the thesis takes place before the final report is sent to the School of Graduate Studies.

Independent Study/Scholarly Project Option:
1. Two credits for the Independent Study (EFR 997) or Scholarly Project (EFR 995).
2. Pass a written final comprehensive examination covering the major field and, at the advisor's discretion, any secondary fields.

3. Preparation of a written independent study or scholarly project must be approved by the faculty advisor.

4. Presentation of independent study or scholarly project takes place before the final report is sent to the School of Graduate Studies.

Educational Leadership

M.S. in Educational Leadership (p. 392)
Specialist Diploma (p. 392)
Ph.D. in Educational Leadership (p. 390)
M.Ed. in Educational Leadership (p. 391)
Ed.D. in Educational Leadership (p. 389)

Courses

EDL 501. Leadership and Organizational Behavior. 3 Credits.
This course provides school leaders with preparation in skills for providing purpose and direction for individuals and groups, shaping school culture and value, facilitating the development of shared strategic vision for the school, formulating goals and planning change efforts with staff, and setting priorities for one's school in the context of community and district priorities for student and staff needs.

EDL 502. Technology and Information Systems. 2 Credits.
This course provides an understanding of selected computer applications for educational administrators. The focus of instruction is to have educational leaders use the computer as a decision-making and planning tool for carrying out communication functions of administration at the building and district levels.

EDL 503. Seminar Educational Leadership. 1-4 Credits.
Repeatable to 4 credits. Repeatable to 4 credits. S/U grading.

EDL 511. Effective Administrative Communications. 3 Credits.
This course prepares aspiring school leaders to plan for their personal and professional development; understand and use the principles of interpersonal, oral, and written communication.

EDL 512. Research, Measurement, and Program Evaluation. 3 Credits.
This course provides school leaders with an understanding of how to determine what diagnostic information is needed about students, staff, and the school environment; examine the extent to which outcomes meet or exceed defined standards, goals, or priorities for individuals or groups; draw inferences for program revisions; interpret and understand research, measurements, and evaluations; relate programs to desired outcomes; develop equivalent measures of incompetence; and design accountability mechanisms.

EDL 513. Leading Curriculum and Learning. 3 Credits.
This course provides school leaders the ability to understand major curriculum design models, interpret school district curricula, initiate needs analyses, plan and implement with staff a framework for instruction, align curriculum with anticipated outcomes, monitor social and technological developments as they affect curriculum, and adjust content as needs and conditions change. Corequisite: EDL 535 or EDL 536 or EDL 537.

EDL 514. Supervision and Staff Development. 3 Credits.
This course provides school leaders with preparation in skills for instructional improvement, working with faculty and staff to identify professional needs. Classes are designed for in-depth study and practice planning, organizing, and facilitating programs that improve faculty and staff effectiveness and are consistent with institutional goals and needs; supervising individuals and groups; providing feedback on performance; arranging for remedial assistance; engaging faculty and others to plan and participate in recruitment and development activities; and initiating self-development.

EDL 515. Education Law and Ethics. 3 Credits.
This course is designed as a beginning law course for school administrators. In addition to the acquisition of legal knowledge as it relates to P-12 education, students are introduced to ethical perspectives that frequently influence the legal decision-making process.

EDL 516. Education Finance and Policy. 3 Credits.
Includes such topics as the organization of and responsibility for education in the United States at the federal, state, and local levels; basic administrative theories, processes, and techniques; and major areas of concern in the operation of local schools. The course includes an experiential learning assignment in which students complete a budget project.

EDL 517. Social, Cultural, Political, and Community Dimensions of Schools. 4 Credits.
This course provides school leaders with an understanding of the historical, philosophical, ethical, social, and economic influences affecting education to the degree that they can apply their understandings to professional decisions. Students are expected to apply political concepts and strategies and approaches to collaboration in involving the community in decision making, building community support for integrating health and social services in support of students, and developing community support for school priorities. Throughout the course, students’ work will be expected to manifest a sensitivity to issues of diversity in a pluralistic society.

EDL 519. Principalship. 2 Credits.
This course provides school leaders with an understanding of the role of the building principal along with skills and techniques associated with the principalship. The topics include the principal's role in community and family relationships and collaboration, using community resources to support the academic and social needs of students and families, the development and application of policies related to students and staff, planning and delivering of curricular and cocurricular programs within the school, and the principal's role in working with staff. Students must also enroll in a one-credit field-based experience (EDL 520, 521 or 522) appropriate for their desired level of preparation for the principalship.

EDL 520. Middle School Principal Field Study. 1 Credit.
This course provides a field-based experience in the role of the middle school principal. Corequisite: EDL 519.

EDL 521. Elementary Principal Field Study. 1 Credit.
This course provides a field-based experience in the role of the elementary school principal. Corequisite: EDL 519.

EDL 522. Secondary Principal Field Study. 1 Credit.
This course provides a field-based experience in the role of the secondary school principal. Corequisite: EDL 519.

EDL 523. The Educational Plant. 3 Credits.
The purpose of this course is to provide a study of the planning, construction, modification, and maintenance of school buildings and complimentary facilities such as playgrounds, athletic fields and facilities, drop-off zones, and parking lots. This course will include appraisal of school facilities and techniques for developing and using input from the community and building and program audits.

EDL 524. Educational Personnel Administration. 2 Credits.
Study of selection, assignment, evaluation, development, and release practices for certified and non-certified school personnel; salary and contract administration in schools.

EDL 526. Business Management in Education. 2 Credits.
Study of the business function in educational organizations with emphasis on budget development and administration, accounting, purchasing, risk management, support services, and capital outlay.

EDL 527. Legal Issues in Education. 3 Credits.
Study of the legal issues affecting educational organizations with emphasis on state and federal relationships to local institutions, school boards and other governing bodies, contracts, teachers' and students' rights, and tort liability of educational organizations and their officers. Consideration is given to legal research and policy analysis.

EDL 529. Special Education Law. 3 Credits.
A course designed to give participants a working knowledge of the legislative, judicial, and administrative changes which have revamped the areas of teaching and administering special education since 1974. It will provide information useful to administrators, practitioners, attorneys, parents, and advocates on topics including: student records, discipline, related services, due process, least restrictive environment, and appropriate education.

EDL 531. School District Leadership. 2 Credits.
A study of concerns and issues related to education leadership and administration at the district level, including relationships between the superintendent and the school board, community and school district staff.
EDL 532. Staff and Program Evaluation. 2 Credits.
A study of the evaluation of staff, including teachers, administrators, support personnel, and boards; and for purposes of accreditation, the evaluation of components that support the curriculum. Procedures, processes, and instruments will be identified and analyzed.

EDL 533. Collective Negotiations. 2 Credits.
A study of the collective bargaining process in the field of education. Includes topics such as contract language, planning for negotiations, bargaining strategies, impasse and arbitration, contract maintenance, grievance procedures, and results of the negotiations.

EDL 535. Administration of Elementary School Curriculum. 1-3 Credits.
Designed primarily for graduate students seeking positions as curriculum coordinators or administrative positions. A study of leadership skills for developing the administrator’s understanding of knowledge construction, adult learning, planning and implementing a framework for curriculum design and instruction, and the professional responsibility for assessing and implementation of an elementary curriculum. The course examines the current issues, trends, subject areas, student achievement, and challenges for the future of elementary curriculum. The student will research the current best practices for application of administrative skills in relationship to supervision of a comprehensive K-5 grade level curriculum and its impact on learners. Corequisite: EDL 513.

EDL 536. Administration of Middle School Curriculum. 1-3 Credits.
Designed primarily for graduate students seeking positions as curriculum coordinators or administrative positions. A study of leadership skills for developing the administrator’s understanding of knowledge construction, adult learning, planning and implementing a framework for curriculum design and instruction, and the professional responsibility for assessing and implementation of the middle school level curriculum. The course examines the current issues, trends, subject areas, student achievement, and challenges for the future of middle school level curriculum. The student will research the current best practices for application of administrative skills in relationship to supervision of a comprehensive 6-8 grade level curriculum and its impact on learners. Corequisite: EDL 513.

EDL 537. Administration of Secondary School Curriculum. 1-3 Credits.
Designed primarily for graduate students seeking positions as curriculum coordinators or administrative positions. A study of leadership skills for developing the administrator’s understanding of knowledge construction, adult learning, planning and implementing a framework for curriculum design and instruction, and the professional responsibility for assessing and implementation of secondary curriculum. The course examines the current issues, trends, subject areas, student achievement, and challenges for the future of middle school level curriculum. The student will research the current best practices for application of administrative skills in relationship to supervision of a comprehensive 9-12 grade level curriculum and its impact on learners. Corequisite: EDL 513.

EDL 538. Auxiliary School Functions. 3 Credits.
Overview of school business and facilities management for educational administrators. Topics include: introduction to special area budgeting and accounting; insurance and risk management; forecasting; vendor relations; supervision of classified and support staff; management of support services, e.g., transportation, food service, facility operation and maintenance, and space utilization analysis, allocation; and cooperative community use of facilities.

EDL 571. School Community Relations. 2 Credits.
Study of the responsibility of classroom, attendance unit, and district personnel in public information efforts; design, use, and analysis of surveys; study of involvement of parents and other community members in resource, advisory, and decision-making activities; preparation of news releases and public information materials; study of relationships to media personnel.

EDL 572. Educational Systems and Planning. 2 Credits.
A study of the planning process including topics such as establishing goals; assessing needs; identifying resources; and generating, analyzing, and selecting alternatives. Processes and techniques in planning will be emphasized.

EDL 573. Administration and Organizational Behavior. 3 Credits.
A study and critique of selected theories and research in administration and organizational behavior including topics such as leadership; formal and informal structure; communication; change and intervention; motivation and morale; interpersonal relations and conflict management; small-group processes; and personality, values, and ethics.

EDL 574. Administration and Organizational Behavior II. 3 Credits.
A continuation of Administration and Organizational Behavior I. Provides the student with the opportunity to design and carry out an original field study project in organizational behavior, participate in critiquing studies designed and completed by fellow students, and engage in individualized study in a topic area related to behavior in organizations.

EDL 575. Education and Public Policy. 3 Credits.
A study of the development of policy issues, analysis of policy formation, implementation analysis, and structures and actors in policy activity.

EDL 579. Special Topics in Educational Leadership. 1-4 Credits.
Exploration of special topics in the study of educational leadership not regularly included in available course offerings. May be repeated for different topics. Prerequisite: Consent of instructor or advisor. Repeatable.

EDL 589. Superintendency Series. 1 Credit.
Repeatable.

EDL 593. Internship in Educational Leadership. 1-8 Credits.
This is a culminating experience primarily for Specialist Diploma and doctoral students. May be repeated. Prerequisites: Appropriate foundational, cognate, and major area coursework and consent of the advisor and instructor. Repeatable.

EDL 597. Readings in Educational Leadership. 1-4 Credits.
Designed primarily for advanced graduate students. May be repeated for different topics. Prerequisites: Consent of advisor and instructor. Repeatable.

EDL 599. Individual Research in Educational Leadership. 1-4 Credits.
May be repeated. Prerequisites: Consent of advisor and instructor. Repeatable.

EDL 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

EDL 997. Independent Study. 1-4 Credits.
Repeatable to 4 credits.

EDL 998. Thesis. 1-9 Credits.

EDL 999. Dissertation. 1-12 Credits.
Repeatable to 12 credits.

Doctor of Education in Educational Leadership

Admission Requirements
The following criteria will be used to assess a student’s application for admission into the doctoral programs in the Department of Educational Leadership. No single criterion can adequately predict a student’s probable success in graduate work; as such, candidates for admission to the doctoral programs are evaluated on the following criteria:

1. Completion of a master’s degree from an accredited college or university
2. Grade point average from all previous graduate work (minimum of 3.5 required)
3. Professional resume
4. Educational leadership essay
5. Statement of professional goals
6. Writing sample
7. Three (3) letters of recommendation
8. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the Graduate Catalog.
9. Students who have received a bachelor’s degree or higher from the United States or English-speaking Canada are not required to submit the TOEFL.
10. All PK-12 applicants are required to have a teaching credential, three years of teaching experience, and leadership experience in PK-12 environments.

Degree Requirements
Students seeking the Doctor of Education degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Educational Leadership Department.

The Ed.D. program in Educational Leadership is designed primarily for practitioners preparing for school administration positions including elementary
Doctor of Philosophy in Educational Leadership

Admission Requirements

The following criteria will be used to assess a student’s application for admission into the doctoral programs in the Department of Educational Leadership. No single criterion can accurately predict a student’s probable success in graduate work; as such, candidates for admission to the doctoral programs are evaluated on the following criteria:

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2. Grade point average from all previous graduate work (minimum of 3.5 required)
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4. Educational leadership essay
5. Statement of professional goals
6. Writing sample
7. Three (3) letters of recommendation
8. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.
9. Students who have received a bachelor’s degree or higher from the United States or English-speaking Canada are not required to submit the TOEFL.
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Degree Requirements

Students seeking the Doctor of Philosophy degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Educational Leadership Department.

The Ph.D. program in Educational Leadership is designed for students preparing for positions in which research and creative experience are predominant interests. Ph.D. candidates are expected to have undertaken and completed independent research leading to an original contribution of knowledge in the field. It is generally expected that the Ph.D. dissertation will be publishable. This degree option typically provides preparation for those who aspire to leadership positions in higher education, in government agencies, or in other educational policy organizations.

1. A minimum of 90 semester credit hours of course work beyond the bachelor’s degree.
2. Maintenance of at least a 3.0 GPA for all classes completed as a graduate student.
3. Completion of a dissertation, which incorporates independent work that is an original contribution to knowledge.
4. With approval of a student’s Faculty Advisory Committee, up to 30 credits from a master’s degree may be transferred from another institution.

Doctor of Philosophy in Educational Leadership

Admission Requirements

The following criteria will be used to assess a student’s application for admission into the doctoral programs in the Department of Educational Leadership. No single criterion can accurately predict a student’s probable success in graduate work; as such, candidates for admission to the doctoral programs are evaluated on the following criteria:

1. Completion of a master’s degree from an accredited college or university
2. Grade point average from all previous graduate work (minimum of 3.5 required)
3. Professional resume
4. Educational leadership essay
5. Statement of professional goals
6. Writing sample
7. Three (3) letters of recommendation
8. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.
9. Students who have received a bachelor’s degree or higher from the United States or English-speaking Canada are not required to submit the TOEFL.
10. All PK-12 applicants are required to have a teaching credential, three years of teaching experience, and administrative experience in PK-12 environments.

Degree Requirements

Students seeking the Doctor of Philosophy degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Educational Leadership Department.

The Ph.D. program in Educational Leadership is designed for students preparing for positions in which research and creative experience are predominant interests. Ph.D. candidates are expected to have undertaken and completed independent research leading to an original contribution of knowledge in the field. It is generally expected that the Ph.D. dissertation will be publishable. This degree option typically provides preparation for those who aspire to leadership positions in higher education, in government agencies, or in other educational policy organizations.

1. A minimum of 90 semester credit hours of course work beyond the bachelor’s degree.
2. Maintenance of at least a 3.0 GPA for all classes completed as a graduate student.
3. Completion of a dissertation, which incorporates independent work that is an original contribution to knowledge.
4. With approval of a student’s Faculty Advisory Committee, up to 30 credits from a master’s degree may be transferred from another institution.
5. Successful completion of comprehensive examinations in Educational Leadership and Educational Research.
6. Successful completion of a final examination.

**Educational Leadership Core Courses**

For PK-12 emphasis:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDL 501</td>
<td>Leadership and Organizational Behavior</td>
<td>3</td>
</tr>
<tr>
<td>EDL 511</td>
<td>Effective Administrative Communications</td>
<td>3</td>
</tr>
<tr>
<td>EDL 513</td>
<td>Leading Curriculum and Learning</td>
<td>3</td>
</tr>
<tr>
<td>EDL 514</td>
<td>Supervision and Staff Development</td>
<td>3</td>
</tr>
<tr>
<td>EDL 515</td>
<td>Education Law and Ethics</td>
<td>3</td>
</tr>
<tr>
<td>EDL 516</td>
<td>Education Finance and Policy</td>
<td>3</td>
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</table>

**Doctoral Core Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDL 503</td>
<td>Seminar Educational Leadership</td>
<td>1-4</td>
</tr>
<tr>
<td>EDL 572</td>
<td>Educational Systems and Planning</td>
<td>2</td>
</tr>
<tr>
<td>EDL 573</td>
<td>Administration and Organizational Behavior</td>
<td>3</td>
</tr>
<tr>
<td>EDL 575</td>
<td>Education and Public Policy</td>
<td>3</td>
</tr>
<tr>
<td>EDL 579</td>
<td>Special Topics in Educational Leadership</td>
<td>12</td>
</tr>
</tbody>
</table>

**Educational Leadership PK-12**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDL 523</td>
<td>The Educational Plant</td>
<td>3</td>
</tr>
<tr>
<td>EDL 524</td>
<td>Educational Personnel Administration</td>
<td>2</td>
</tr>
<tr>
<td>EDL 526</td>
<td>Business Management in Education</td>
<td>2</td>
</tr>
<tr>
<td>EDL 527</td>
<td>Legal Issues in Education</td>
<td>3</td>
</tr>
<tr>
<td>EDL 529</td>
<td>Special Education Law</td>
<td>3</td>
</tr>
<tr>
<td>EDL 531</td>
<td>School District Leadership</td>
<td>2</td>
</tr>
<tr>
<td>EDL 532</td>
<td>Staff and Program Evaluation</td>
<td>2</td>
</tr>
<tr>
<td>EDL 571</td>
<td>School Community Relations</td>
<td>2</td>
</tr>
</tbody>
</table>

**Established Area(s)**

One or two cognate areas or one minor area outside Educational Leadership and often outside the field of Education to support the area of emphasis.

**Scholarly Tools**

Select from approved courses that provide the scholarly tools to support educational research

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EFR 500</td>
<td>Introduction to the Foundations of Education</td>
<td>3</td>
</tr>
</tbody>
</table>

Select one of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EFR 501</td>
<td>Psychological Foundations of Education</td>
<td>3</td>
</tr>
<tr>
<td>EFR 502</td>
<td>Issues and Trends in Education</td>
<td>3</td>
</tr>
<tr>
<td>EFR 503</td>
<td>Historical Foundations of Education</td>
<td>3</td>
</tr>
<tr>
<td>EFR 504</td>
<td>Philosophical Foundations of Education</td>
<td>3</td>
</tr>
<tr>
<td>EFR 505</td>
<td>Sociological Foundations of Education</td>
<td>3</td>
</tr>
<tr>
<td>EFR 506</td>
<td>Multicultural Education</td>
<td>3</td>
</tr>
<tr>
<td>EFR 507</td>
<td>Gender, Sexuality and Education</td>
<td>3</td>
</tr>
<tr>
<td>EFR 508</td>
<td>Anthropological Foundations of Education</td>
<td>3</td>
</tr>
</tbody>
</table>

**Cognate Area(s)**

One or two cognate areas or one minor area outside Educational Leadership and often outside the field of Education to support the area of emphasis.

**Scholarly Tools**

Select from approved courses that provide the scholarly tools to support educational research

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>EFR 500</td>
<td>Introduction to the Foundations of Education</td>
<td>3</td>
</tr>
</tbody>
</table>

Select one of the following:

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<tr>
<td>EFR 501</td>
<td>Psychological Foundations of Education</td>
<td>3</td>
</tr>
<tr>
<td>EFR 502</td>
<td>Issues and Trends in Education</td>
<td>3</td>
</tr>
<tr>
<td>EFR 503</td>
<td>Historical Foundations of Education</td>
<td>3</td>
</tr>
<tr>
<td>EFR 504</td>
<td>Philosophical Foundations of Education</td>
<td>3</td>
</tr>
<tr>
<td>EFR 505</td>
<td>Sociological Foundations of Education</td>
<td>3</td>
</tr>
<tr>
<td>EFR 506</td>
<td>Multicultural Education</td>
<td>3</td>
</tr>
<tr>
<td>EFR 507</td>
<td>Gender, Sexuality and Education</td>
<td>3</td>
</tr>
<tr>
<td>EFR 508</td>
<td>Anthropological Foundations of Education</td>
<td>3</td>
</tr>
</tbody>
</table>

**Research and Foundations/Cognate**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EFR 500</td>
<td>Introduction to the Foundations of Education</td>
<td>3</td>
</tr>
<tr>
<td>EFR 509</td>
<td>Introduction to Applied Educational Research</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Electives</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Credits**

98-120

* If the Master’s degree or Specialist Diploma did not include these courses or their equivalent, they must be completed as soon as possible after admission to the Ph.D. program.
** As appropriate, elective courses are selected from one of the following areas to fulfill individual needs and goals in consultation with a student’s Faculty Advisory Committee. A minimum of 30 credits of Educational Leadership courses is required. A concentration of 48 credits in the major (including Educational and Leadership courses, scholarly tools courses and a dissertation) is required.

- Curriculum and Instruction
- Leadership and General Administration
- Management of Resources

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**Master of Education in Educational Leadership**

**Admission Requirements**

1. A bachelor’s degree from an accredited college or university.
2. A cumulative undergraduate GPA of 2.75 or at least 3.00 for the last two years.
3. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.
4. Students who have received a bachelor’s degree or higher from the United States or English-speaking Canada are not required to submit the TOEFL.
5. All applicants are required to respond to essay questions provided in the application, and submit a resume and a writing sample.
6. All PK-12 applicants are required to submit to a background check.
7. Typically, teaching experience beyond Pk-12 student teaching is required.

**Degree Requirements**

1. Thirty-five to thirty-nine credits at or above the 500 level.
2. At least 12 credits, including 2 for the EDL 997 Independent Study, must be in a single field or area of concentration.
3. At least 6 credits must be in an area or areas of concentration (major).
4. At least 6 credits must be in Educational Foundations and Research.
5. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.
6. Preparation of a written, faculty approved Independent Study or successful completion of the id21 assessment.

**M.Ed. Degree (PK-12 Emphasis)**

**Required Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDL 501</td>
<td>Leadership and Organizational Behavior</td>
<td>3</td>
</tr>
<tr>
<td>EDL 503</td>
<td>Seminar Educational Leadership</td>
<td>1-3</td>
</tr>
<tr>
<td>EDL 511</td>
<td>Effective Administrative Communications</td>
<td>3</td>
</tr>
<tr>
<td>EDL 513</td>
<td>Leading Curriculum and Learning</td>
<td>3</td>
</tr>
<tr>
<td>EDL 514</td>
<td>Supervision and Staff Development</td>
<td>3</td>
</tr>
<tr>
<td>EDL 515</td>
<td>Education Law and Ethics</td>
<td>3</td>
</tr>
<tr>
<td>EDL 516</td>
<td>Education Finance and Policy</td>
<td>3</td>
</tr>
<tr>
<td>EDL 519</td>
<td>Internship: Curricular and Administrative Leadership</td>
<td>2</td>
</tr>
<tr>
<td>EDL 529</td>
<td>Special Education Law</td>
<td>3</td>
</tr>
</tbody>
</table>

**Select one of the following:**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDL 520</td>
<td>Middle School Principal Field Study</td>
<td>1-3</td>
</tr>
<tr>
<td>EDL 521</td>
<td>Elementary Principal Field Study</td>
<td>1-3</td>
</tr>
<tr>
<td>EDL 522</td>
<td>Secondary Principal Field Study</td>
<td>1-3</td>
</tr>
</tbody>
</table>

**Electives**

3

**Total Credits**

35-39
### Master of Science in Educational Leadership

#### Admission Requirements
1. A bachelor’s degree from an accredited college or university.
2. A cumulative undergraduate GPA of 2.75 or at least 3.00 for the last two years. Typically, applicants with teaching experience in schools apply to the M.Ed. program, not the M.S. program.
3. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the Graduate Catalog.
4. A minimum of 64 semester hours of coursework beyond the Bachelor’s degree is required for the Specialist Diploma. Students seeking the Master of Science degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Educational Leadership Department.
5. Preparatory in writing capstone project approved by the faculty advisor.
6. Comprehensive final examination.

#### Degree Requirements

Students seeking the Master of Science degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Educational Leadership Department.

1. Thirty-seven (37) credits, including credits required for the major.
2. A minimum of two credits of Independent Study.
3. At least one-half of the credits must be at or above the 500-level.
4. A maximum of one-fourth (usually 8-9 semester credits) of the credit hours required for the degree may be transferred from another institution.
5. Preparation of a written capstone project approved by the faculty advisor.
6. Comprehensive final examination.

#### M.S. Degree (Higher Education Emphasis)

<table>
<thead>
<tr>
<th>Required Courses</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDL 503 Seminar Educational Leadership</td>
<td>1</td>
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<tr>
<td>EDL 513</td>
<td>3</td>
</tr>
<tr>
<td>EDL 541</td>
<td>3</td>
</tr>
<tr>
<td>EDL 548</td>
<td>3</td>
</tr>
<tr>
<td>EDL 549</td>
<td>3</td>
</tr>
<tr>
<td>EDL 556</td>
<td>3</td>
</tr>
<tr>
<td>EDL 559</td>
<td>1</td>
</tr>
<tr>
<td>EDL 593 Internship in Educational Leadership</td>
<td>3</td>
</tr>
<tr>
<td>EDL 997 Independent Study</td>
<td>2</td>
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</tbody>
</table>

**Research and Foundations/Cognate**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EFR 500 Introduction to the Foundations of Education</td>
<td>3</td>
</tr>
<tr>
<td>EFR 509 Introduction to Applied Educational Research</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 541 History of Higher Education in the United States</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Credits:** 37

#### Specialist Diploma in Educational Leadership

The Specialist Diploma, available at UND only in Educational Leadership, is designed for students preparing for school administrative positions. This course of study is usually considered to be a terminal program of advanced preparation for professional practice. Upon completion of the Specialist Diploma, a student generally will have completed the requirements for an administrative credential, including those required for the position of school superintendent in North Dakota. A minimum of 64 semester hours of course work beyond the Bachelor’s degree is required for the Specialist Diploma. The Specialist Diploma must include approximately 30 credits beyond the Master’s degree.

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDL 501 Leadership and Organizational Behavior</td>
<td>3</td>
</tr>
<tr>
<td>EDL 503 Seminar Educational Leadership</td>
<td>1-4</td>
</tr>
<tr>
<td>EDL 511 Effective Administrative Communications</td>
<td>3</td>
</tr>
<tr>
<td>EDL 513 Leading Curriculum and Learning</td>
<td>3</td>
</tr>
<tr>
<td>EDL 514 Supervision and Staff Development</td>
<td>3</td>
</tr>
<tr>
<td>EDL 515 Education Law and Ethics</td>
<td>3</td>
</tr>
<tr>
<td>EDL 516 Education Finance and Policy</td>
<td>3</td>
</tr>
<tr>
<td>EDL 519 Internship: Curricular and Administrative Leadership</td>
<td>3</td>
</tr>
<tr>
<td>&amp; EDL 520 &amp; EDL 521 Elementary Principal Field Study</td>
<td>3</td>
</tr>
<tr>
<td>or EDL 522 Secondary Principal Field Study</td>
<td>3</td>
</tr>
<tr>
<td>EDL 535 Administration of Elementary School Curriculum</td>
<td>1-3</td>
</tr>
<tr>
<td>EDL 536 Administration of Middle School Curriculum</td>
<td>1-3</td>
</tr>
<tr>
<td>EDL 537 Administration of Secondary School Curriculum</td>
<td>1-3</td>
</tr>
</tbody>
</table>

**Required Courses in District Level Administration with a master’s degree in administration**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDL 523 The Educational Plant</td>
<td>3</td>
</tr>
<tr>
<td>EDL 524 Educational Personnel Administration</td>
<td>2</td>
</tr>
<tr>
<td>EDL 526 Business Management in Education</td>
<td>2</td>
</tr>
<tr>
<td>EDL 527 Legal Issues in Education</td>
<td>3</td>
</tr>
<tr>
<td>EDL 571 School Community Relations</td>
<td>2</td>
</tr>
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</table>

**Foundations**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EFR 500 Introduction to the Foundations of Education</td>
<td>3</td>
</tr>
<tr>
<td>EFR 501 Psychological Foundations of Education</td>
<td>3</td>
</tr>
<tr>
<td>EFR 502 Issues and Trends in Education</td>
<td>3</td>
</tr>
<tr>
<td>EFR 503 Historical Foundations of Education</td>
<td>3</td>
</tr>
<tr>
<td>EFR 504 Philosophical Foundations of Education</td>
<td>3</td>
</tr>
<tr>
<td>EFR 505 Sociological Foundations of Education</td>
<td>3</td>
</tr>
<tr>
<td>EFR 506 Multicultural Education</td>
<td>3</td>
</tr>
<tr>
<td>EFR 507 Gender, Sexuality and Education</td>
<td>3</td>
</tr>
<tr>
<td>EFR 508 Anthropological Foundations of Education</td>
<td>3</td>
</tr>
</tbody>
</table>

**Cognate Area(s)**

A minimum of 12 credits (to a maximum of 24 credits) of course work must be in one or two cognate areas outside Educational Leadership and may be outside the field of Education. The cognate area(s) are needed to support the area of emphasis.

**Research Methods**

Select from approved courses that provide the scholarly tools to support research

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDL 593 Internship in Educational Leadership</td>
<td>3-8</td>
</tr>
</tbody>
</table>

**Independent Study**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDL 997 Independent Study</td>
<td>4</td>
</tr>
</tbody>
</table>

**Total Credits:** 63-91

* These required courses include practicum in each class.
** As appropriate, elective courses are selected from one of the following areas to fulfill individual needs and goals in consultation with the Faculty Advisory Committee. A minimum of 20 credits of Educational Leadership courses is required. A concentration of 40 credits in the major (including Foundations and Educational Leadership courses and an Independent Study) is required.

- Curriculum and Instruction
- Leadership and General Administration
- Management of Resources

*** Not required but is often advisable, depending upon student experience and goals.

### Teaching and Learning

Ed.D. in Educational Practice & Leadership (p. 395)
Courses

**T&L 511. Assessment in ECE. 3 Credits.** This course examines the construct and practice of assessment for teaching in birth to third-grade learning environments. The course considers the critical issues related to assessment and accountability in schools, focusing on why assessment is necessary, who the various assessment audiences are, what kind of assessment information is useful for each, and the time frame appropriate for such assessment information. Students study a variety of assessment methods currently used to evaluate teaching and learning in classrooms. They also discuss ways to communicate formative information about student progress to families, collaborate with colleagues to use assessment results to modify grade-level curricula for children with diverse abilities, and advocate for culturally, linguistically, and developmentally-appropriate forms of assessment. SS.

**T&L 513. Linguistics for ELL Teachers. 3 Credits.** This course introduces the complexities of human language through the study of phonetics, phonology, morphology, syntax and semantics. Additional topics addressed include the brain and language, history of the English language, psycholinguistics, writing systems and language in social contexts. SS.

**T&L 514. Introduction to Multilingual Education. 3 Credits.** This course explores language education models, programs and policies with an emphasis on English language learners (ELLs). Political, legal, historical, and cultural contexts of multilingual education will be discussed with a focus on both U.S. and global challenges.

**T&L 515. Middle School Curriculum. 3 Credits.** This course examines the middle school curriculum and instructional strategies as well as the needs of early adolescents. The course focuses on the roles teachers play in incorporating a guided, interdisciplinary, collaborative team approach. The studies include the components of curriculum teaching, advisory, exploration, learning communities) and instruction (differentiation, cooperative learning, learning styles, instructional strategies) incorporated in middle schools.

**T&L 516. Philosophy and Foundations of Middle School Education. 3 Credits.** This course examines the historical and philosophical background of middle level education. The focus is on the roles teachers/administrators play in incorporating this guided, interdisciplinary, collaborative team approach that assists students during these fundamentally transformative years. The course looks at the philosophical aspect of the curriculum and instructional component. The studies explore contemporary issues associated with the middle school as well as the adaptations necessary for special circumstances affiliated with middle schools.

**T&L 517. Social Emotional Learning & Guidance. 3 Credits.** This course is designed to offer strategies for caregivers to support young children's positive social and emotional development, behavior, and learning through the exploration of how early experiences shape development. The emotional and social development of children, including the causes, expressions, prevention and management of challenging behaviors in all children birth to age eight are examined. Emphasis is placed on caregiver/family/child relationships, positive emotional/social environments, developmental implications, adverse childhood risk factors, and intervention strategies. Students will identify factors influencing emotional/social development, utilize screening measures, and design positive behavioral supports. SS.

**T&L 518. Science in the Elementary School. 3 Credits.** A study of current trends and practices associated with teaching and assessing inquiry-based science in elementary classrooms.

**T&L 519. Social Studies in the Elementary School. 3 Credits.** A study of current trends and practices associated with teaching and assessing social studies in elementary classrooms.

**T&L 520. Curriculum and Instruction in the Elementary School. 4 Credits.** A study of processes for planning, implementing, and evaluating curriculum and improving instruction in elementary schools.

**T&L 521. Differentiated Instruction. 3 Credits.** An introduction to the principles of differentiated instruction. Topics of study include: brain-based learning, responsive instructional and assessment strategies, linking curriculum standards to learner needs, organizing and managing a differentiated classroom, and relevant resources for implementation.

**T&L 522. Mathematics in the Elementary School. 3 Credits.** A study of current trends and practices associated with teaching and assessing inquiry-based math in elementary classrooms.

**T&L 523. Literacy Instruction for English Language Learners. 3 Credits.** This course addresses the foundations of teaching English language and literacy to English Language Learners (ELLs). Topics will include practices for reading and writing instruction, vocabulary development, assessment of reading and writing, choosing literature for ELLs, and the incorporation of media and technology in ELL literacy instruction. SS.

**T&L 524. Reading in the Content Areas. 2 Credits.** How and why reading should be taught in the content areas (i.e. Social Studies, Science, Mathematics, etc.). Research studies in the field of content reading and a variety of instructional practices are reviewed.

**T&L 525. Writing in the Classroom. 3 Credits.** This course examines writing as a process that is developmental, cultural, social, and individual. Emphasis is on effective implementation of the essential structures of writing workshop and on monitoring and assessing writers' growth.

**T&L 526. Play in Development and Early Childhood Education. 3 Credits.** This course explores the role of play in cognitive, physical and social-emotional development, and the way in which play is incorporated into educational and other programmatic settings. Students will explore how assessment of play indicates a child's development, and they will use assessment to promote Developmentally Appropriate Practices (DAP) for PreK-Grade 3 (ages 3-8) learners.

**T&L 527. Curricular Foundations in Early Childhood Education. 3 Credits.** This course examines the historical, philosophical, cultural, race, class, and gender influences on curriculum in early childhood, including the philosophy and mission of the Department of Teaching and Learning.

**T&L 528. Children's and Young Adult Literature in the Classroom. 3 Credits.** This course explores the major area of literature for children and young adults in response to two questions: What is the range of literature available for children and young adults today? In what ways might children's and young adult literature be used in the classroom to promote literacy growth?. SS.

**T&L 529. Language Development & Cognition in Children. 3 Credits.** This course provides foundational information about language and cognitive development in children. The course content will also analyze typical and atypical language and cognitive development. The focus of the course will include children birth to age eight .

**T&L 530. Foundations of Reading Instruction. 3-4 Credits.** This course focuses on the relationship between reading theory, research, contemporary issues and instructional practice. Emphasis is placed on strategic systems related to effective reading, instructional approaches that support the development of these strategic systems and assessment as collecting evidence of effective reading behaviors.

**T&L 531. Early Literacy Development and Instruction. 3 Credits.** A study of early literacy processes including phonemic and print awareness, word recognition, comprehension, and writing. Emphasis is on reviewing current research and theory, assessment and instruction practices, and bridging language and literacy development in literacy rich environments.

**T&L 532. Leadership in Literacy. 3 Credits.** The role of the literacy coach is to support teachers in closing the gap between learners' performance and achievement in reading and writing. Topics in this course will include providing leadership for a school's literacy program, collaboration with teachers and administrators, curriculum issues, knowledge of literacy standards, and professional development facilitation. On demand.
T&L 533. Secondary English Language Arts & Literacy Instruction. 3 Credits.
This graduate level course explores teaching literacy in the English Language Arts middle and high school classroom. Students will explore how the traditional and contemporary approaches to teaching literature, nonfiction, and digital media work to support the advanced literacy goals of reading, writing, listening and speaking for adolescents. Students will explore Language Arts instructional methods and develop curriculum in the areas of literature, writer's workshop, academic inquiry, language vocabulary, and digital literacy. Students will also explore the ways the literacy program is supported and assessed throughout the entire secondary school. SS.

T&L 534. Basic Reading Diagnosis and Remediation. 2 Credits.
Focuses on common causes of reading disability, methods of diagnosis, and corrective reading programs in the classroom. Corequisite: T&L 583.

T&L 535. Advanced Reading/Language Arts Diagnosis and Remediation. 2 Credits.
Analysis of interrelationships of learning difficulties in language arts areas and procedures for remediation. Prerequisites: T&L 530 and T&L 534.

T&L 536. Innovations in English Language Arts Instruction. 3 Credits.
This course considers the current curricular trends and research-based best practices in teaching English Language Arts. Students will critically examine and apply current instructional approaches in teaching English language and vocabulary, classroom discourse practices, and digital literacies. We will consider the ways various instructional methods support the advancement of literacy development for all students, considering ways to modify and adapt curriculum to meet the cultural and linguistic diversity of today's classrooms. On demand.

T&L 537. ELL Methods and Materials. 3 Credits.
This course explores current methods and materials in ELL education, with a focus on teaching academic language and sheltered content instruction. F.S.SS.

T&L 538. Supervision of Student Teaching. 2 Credits.
For supervisors and directors of student teaching in colleges and cooperating schools. Principles and practices on how to provide the most beneficial experiences for student teachers.

T&L 539. College Teaching. 3 Credits.
Explores learning styles and teaching styles, the components and responsibilities involved in college teaching, methods of teaching and motivating students, and current issues related to instruction in the college classroom.

T&L 540. Theory and Philosophies of Curriculum in Schools. 3 Credits.
This course explores the historical development of the K-12 curriculum, the philosophical and theoretical aspects applied to curriculum, and the social conditions that impact curriculum.

T&L 541. History of Higher Education in the United States. 3 Credits.
Study of major events and people shaping higher education in the U.S. Role, philosophy, and organization of institutions of higher education discussed.

T&L 542. Models of Teaching. 3 Credits.
This course focuses on various models of teaching: social interaction, information-processing, inquiry and behavioral. The purpose of the course is to provide teachers with a variety of instructional models related to meaningful learning experiences for students.

T&L 543. Scholarly Writing. 3 Credits.
Designed to assist students with learning the art of scholarly writing, this course will aid students in designing, formatting, and completing research-based and other scholarly writing projects, as well as understanding the rules and norms of academic publishing.

T&L 544. Assessment in Higher Education. 3 Credits.
A wide range of assessment issues in higher education will be explored. This includes course, program, and institutional assessment as well as classroom assessment techniques. Students will examine and understand the assessment process.

T&L 545. Adult Learners. 3 Credits.
This course will cover theories of adult development, current research on adult learners, ways of assessing the needs and interests of adult learners, and ways of creating environments in which adult learners can thrive.

T&L 546. College Students with Special Needs. 3 Credits.
This course explores the range of special needs college students bring to campus and how faculty, staff, and administrators might appropriately meet those needs. Prerequisite: Admission to the School of Graduate Studies or instructor permission. S.

T&L 547. Technology in Higher Education. 3 Credits.
Students will examine the various uses and integration of technology and media in higher education by faculty in their attempt to engage learners with each other, the course content, and with instructors.

T&L 548. The Professoriate. 3 Credits.
This course is a study of the development of the American professoriate by way of historical, scholarly, popular, and contemporary perspectives. It also examines the transition of new faculty members to their initial academic appointment.

T&L 549. Seminar. 1-4 Credits.
The seminar will focus on a specific topic relating to teaching and learning. The specific content will vary depending upon student needs and faculty resources. Repeatable. S/U grading.

T&L 550. Assessment and Evaluation in ELL Education. 3 Credits.
This course combines readings and theoretical discussion of assessment with hands-on experience in assessing ELLs. Students will learn how to use a variety of formal and informal assessments with a focus on how to use assessment data in planning instruction. Topics will include classroom-based assessments, language proficiency testing, testing accommodations for ELLs, and assessment of ELLs for special education and gifted education; and ELL program evaluation.

T&L 551. Second Language Acquisition for ELL Teachers. 3 Credits.
This course will explore the socio- and psycho-linguistic aspects of interlanguage by studying the theories and research of first and second language acquisition. Students will examine the nature of learners and their individual differences during the stages of language development, with a focus on children and K-12 classrooms.

T&L 553. Collaborative Relationships: Home, School and Community. 3 Credits.
A course appropriate for anyone working with families, early childhood educators, general educators, special educators, related service personnel, administrators and outside agency personnel. Topics covered include: (1) the various models of collaboration and consultation and the stages of each; (2) communication skills; (3) problem-solving; (4) conflict management; (5) diverse perspectives; (6) information collection procedures; (7) supervisory skills; (8) family characteristics and structure across the lifespan; (9) family focused intervention; (10) school choices; and (11) school issues such as poverty, domestic violence, teasing, bullying, and school violence.

T&L 558. Middle School Science and Engineering Lab1:Solids. 2 Credits.

T&L 559A. MS Sci.Eng-2: Solids. 3 Credits.
Prerequisites: T&L 558, admission to Graduate School, ND Teacher licensure and Admission to program "Improving Math and Science Literacy of Middle and High School Students of North Dakota Through Teacher-Faculty Partnerships".

T&L 559B. MS Sci.Eng-2: Solids. 3 Credits.
Prerequisites: T&L 558, admission to Graduate School, ND Teacher licensure and Admission to program "Improving Math and Science Literacy of Middle and High School Students of North Dakota Through Teacher-Faculty Partnerships".

T&L 560. Brain in Memory and Learning. 3 Credits.
Prerequisite: Admissions to Grad School.

T&L 566. Language Structure and Analysis for ELL Teachers. 3 Credits.
This course explores the grammatical and discourse structures of the modern English language, analysis of grammar and discourse with a focus on specific problem areas for ELLs, and pedagogical implications for English language development.

T&L 568. Research and Advocacy in TESOL. 3 Credits.
This course prepares teachers to both understand and conduct research in TESOL. Emphasis will be placed on using research data to advocate for changes and improvement in ELL education.

T&L 569. Action Research. 3 Credits.
The study of the philosophy and methods of action research. Emphasis is focused on analysis of and reflection on one's teaching for the purpose of improvements in student learning. Prerequisite: Graduate status. S.
T&L 571. Teacher Education. 3 Credits.
Practices, issues, and trends in the design and implementation and assessment of programs for the preparation and development of K-12 teachers.

T&L 572. Teacher Education: Focus on the Learner. 3 Credits.
The study of teacher education in relation to the lives of P-12 students. This course includes the examination of children and their lives through aspects of race, religion, socioeconomics, linguistics and age, and considers educational implications for preservice and inservice teachers.

T&L 573. Middle School Science and Engineering Lab2: Liq/Gas. 2 Credits.

T&L 574. MS Sci.Eng.-4: Liquid/Gas. 3 Credits.
Prerequisites: T&L 573, admission to Graduate School, ND Teacher licensure and Admission to program "Improving Math and Science Literacy of Middle and High School Students of North Dakota Through Teacher-Faculty Partnerships".

T&L 575. Middle School Science and Engineering Lab3: Mot/Elec. 2 Credits.

T&L 576A. MS Sci.Eng.-6: Motion/Electric. 3 Credits.
Prerequisites: T&L 575, admission to Graduate School, ND Teacher License and employment as a teacher in a ND school.

T&L 576B. MS Sci.Eng.-6: Motion/Electric. 3 Credits.
Prerequisite: T&L 576A.

T&L 577. Assessment of Learning. 3 Credits.
This course addresses the theory and practice of assessment, specifically the process of gathering and discussing information from multiple and diverse sources in order to develop a deep understanding of what students know, understand, and can do with their knowledge as a result of educational experiences.

T&L 579. Classroom Based Inquiry. 3 Credits.
Concepts learned in T&L 569 will be looked at in-depth and theoretical constructs such as Living Theory, Self Study, and Critical Theory constructs will be studied. Students plan and conduct an in-depth inquiry project within a school setting, complete the associated IRB, and create and academic poster and/or prepare a proposal of the Inquiry project for a professional setting.
Prerequisites: TL 569; or by permission of instructor, F.S.

T&L 580. Practicum in Schools. 1-4 Credits.
Practicum in study of desirable school practices, observations in nearby schools, and application of research findings in solving practical problems.
Prerequisites: Appropriate foundational and major area courses, and consent of the instructor and advisor. Repeatable.

T&L 581. Resident Internship. 4 Credits.
A full-time, year-long internship experience conducted in a cooperating school district. Interns are assigned as members of instructional teams with full responsibility for a portion of the cooperating school's instructional program.
Prerequisites: Participation in the summer program prior to the internship and teaching licensure (see dept for approval).

T&L 582. Resident Internship. 4 Credits.
A full-time, year-long internship experience conducted in a cooperating school district. Interns are assigned as members of instructional teams with full responsibility for a portion of the cooperating school's instructional program.
Prerequisites: Participation in the summer program prior to the internship and teaching licensure (see dept for approval).

T&L 583. Reading Clinic. 2 Credits.

T&L 584. Internship in Education. 1-8 Credits.
This is a culminating experience primarily for Sixth year and Doctoral students. The internships will be identified in one of the following sub-areas: (A) Educational Administration, (B) Special Education, (C) Curriculum, (D) Educational Research, or (E) Teacher Education. Prerequisites: Appropriate foundational, cognate, and major area coursework and consent of advisor and instructor. Repeatable.

T&L 589. Professional Development: Resident Teacher Program. 2 Credits.
This field-based experience provides mentoring and coaching, translates baccalaureate theory and research into practice, and requires active participation in the school placement and classroom setting. Issues and topics relevant to first year teachers and graduate education are emphasized through field work and discussions. Prerequisite: Admission into the Elementary Education Resident Teacher Program. SS.

T&L 590. Special Topics. 1-4 Credits.
Exploration of special topics in the study of education not regularly included in available course offerings. May be repeated for different topics. Prerequisite: Consent of instructor or advisor. Repeatable.

T&L 591. Readings in Education. 1-4 Credits.
Designed primarily for advanced graduate students. May be repeated for different topics. Prerequisite: Consent of instructor and advisor. Repeatable.

T&L 593. Independent Projects. 1-4 Credits.
Repeatable.

T&L 596. Individual Research in Education. 1-4 Credits.
Prerequisite: Consent of instructor and advisor. Repeatable.

T&L 995. Scholarly Project. 2 Credits.
The scholarly project demonstrates critical analysis and application of information and experiences gained throughout the program of study. The project allows students to demonstrate scholarly skills in an integrated manner that is directly related to their roles as teachers, program evaluators, and action researchers. The scholarly project must be approved by the student's adviser.

T&L 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

T&L 997. Independent Study. 2 Credits.

T&L 998. Thesis. 1-9 Credits.
Repeatable to 9 credits.

T&L 999. Dissertation. 1-15 Credits.
Repeatable to 15 credits.

Undergraduate Courses for Graduate Credit

T&L 322. Administration and Leadership in Early Childhood Education. 3 Credits.
An investigation of patterns of administration, curriculum organization, spatial resources, and staffing in early childhood settings, serving children 0-8 years old. Topics include federal and state laws and emerging trends in preschool and primary education in the state, region, and nation. Sixteen (16) hours of field experience. Prerequisite: Admission to the Teacher Education program. S.

T&L 422. Development of the Gifted and Talented. 2 Credits.
Research and theory for understanding the development needs of the more able child in early childhood and in educational experiences. S.

T&L 423. Assessment and Individualized Planning in Special Education. 3 Credits.
A study of the principles and practices of: (1) obtaining diagnostic information on school-related problems of a student; (2) assimilating this information and prescribing appropriate alterations based on continuous measurement data. Prerequisites or Corequisites: TL 315 and T&L 319. F.S.

T&L 493. Workshop. 1-4 Credits.
Special problems in Special Education; consideration of special problems of concern to the Special Education teacher and other educators. Repeatable to 8 credits. F.S.

Doctor of Education in Educational Practice and Leadership

Admission Requirements:
The following criteria will be used to assess a student's application for admission into the Doctor of Education in Educational Practice and Leadership program. No single criterion can adequately predict a student's probable success in graduate work. Applicants should anticipate that the materials they submit will be held to high standards with submission of the following:

1. The applicant must meet the School of Graduate Studies' current minimum general admission requirements as published in the graduate catalog.
2. Completion of a master's degree from an accredited college or university
3. Grade point average from all previous graduate work (minimum of 3.5 required)
4. Professional resume.
5. Transcripts.
6. Three letters of recommendation that address your academic ability, professional accomplishments related to your field of study, and positive character traits.
7. A statement of clear professional/educational goals that can be met by this program/specialization as specified in the graduate catalog.
8. Essay. An original essay not to exceed four double-spaced pages (exclusive of references) on a contemporary problem of practice. The writing will be reviewed for:
   a. overall suitability for doctoral level study;
   b. cohesive development of ideas;
   c. support for ideas; and
   d. writing conventions.
9. Writing sample.
   a. Include with your application an individually-authored sample of your writing that the admission committee can use to evaluate your ability as a writer and potential success in the doctoral program.
   b. The minimum length of the sample is five pages and should not exceed 30 pages. Examples of possible writing samples include, but are not limited to, journal articles, paper from a course, or some written work product such as a manual or technical report.
10. The applicant must sign a statement attesting that the goal statement, essay, and writing sample submitted were original compositions of the applicant, completed without the aid of an editor.
11. Applicants for the School Leadership specialization are required to have a teaching credential, three years of teaching experience, and leadership experience in PK-12 environments and to pass a background check.

Degree Requirements:
1. A minimum of 90 semester credit hours of course work beyond the bachelor’s degree.
2. Maintenance of at least a 3.0 GPA for all classes completed as a graduate student.
3. With approval of a student’s Faculty Advisory Committee, up to 30 credits from a master’s degree may be transferred from another institution.
4. Successful completion of comprehensive examinations.
5. Completion of a Dissertation in Practice (9 credits).
6. Ed.D. Core Coursework (9 credits):
   - EFR 502 Issues and Trends in Education
   - HE 569 Diversity Systems and Policy in Education
   - EDL 573 Administration and Organizational Behavior
7. Scholarly Tools Coursework (9 credits):
   - EFR 509 Introduction to Applied Educational Research
   - Select 2 Additional Courses (6 credits)
   - T&L 569 Action Research
   - T&L 579 Classroom Based Inquiry
   - EFR 511 Program Evaluation
   - EFR 530 Learning Analytics
8. In addition, you may choose one or more specialization areas and complete the required courses. Elective credits can be selected from graduate courses in other specializations and from the Educational Foundations and Research (EFR) program in consultation with academic advisor.

Descriptions of Specializations:
- Higher Education (HE): The HE area prepares administrators and/or professors for leadership in an academic discipline at a college or university.
- School Leadership (SL): The SL area is designed primarily for the practitioners preparing for school administration positions including elementary, middle school, and secondary principals; superintendents; curriculum directors, and other school district central office positions.
- Special Education (SPED): The SPED area is focused on preparing experienced professionals for the role as an Educational Diagnostician. Diagnosticians evaluate students to determine services and effective programming, as well as provide leadership at the school and district levels to inform policies and practices.
- Teacher Education (TE): The TE area prepares professors of education at a college or university and/or as an educational specialist to teachers in PK-12 schools.

Higher Education

Higher Education Required Courses (15 credits)
- HE 532 Principles and Practices in Higher Education
- HE 536 Leading and Learning in Higher Education
- T&L 541 History of Higher Education in the United States
- T&L 544 Assessment in Higher Education
- T&L 545 Adult Learners

Higher Education Elective Courses (18 credits)
- HE 538 College Student Experiences
- HE 561 Curriculum in Higher Education
- HE 563 Academic Administration in Higher Education
- HE 564 Higher Education Student and Support Services
- HE 570 Higher Education Law
- HE 573 Higher Education and Public Policy
- HE 576 Higher Education Planning and Finance
- T&L 539 College Teaching
- T&L 543 Scholarly Writing
- T&L 548 The Professoriate
- T&L 547 Technology in Higher Education

Elective credits can be selected from graduate courses in other specializations and from the Educational Foundations and Research (EFR) program in consultation with academic advisor.

School Leadership

School Leadership Required Courses (18-25 credits)
- EDL 524 Educational Personnel Administration
- EDL 526 Business Management in Education
- EDL 527 Legal Issues in Education
- EDL 531 School District Leadership
- EDL 532 Staff and Program Evaluation
- EDL 575 Education and Public Policy
- EDL 579 Special Topics in Educational Leadership
- EDL 593 Internship in Educational Leadership

Elective credits can be selected from graduate courses in other specializations and from the Educational Foundations and Research (EFR) program in consultation with academic advisor.

Special Education

Special Education Required Courses (32 credits)
- SPED 521 Transition to Adult Life
- SPED 525 Legal/Ethical Aspects in Special Education
- SPED 544 Research Methods in Behavior Analysis
- SPED 557 Progress Monitoring
- SPED 570 The Educational Diagnostician
- SPED 571 Social, Emotional, and Behavioral Assessment
SPED 572  Achievement Assessment Measures in Special Education  3
SPED 582  Internship: Educational Diagnostician  1-4
T&L 529  Language Development & Cognition in Children  3
COUN 570  Cognitive Assessment Measures in Special Education  3

Special Education Elective Courses: These courses will be selected based on previous coursework to meet Council for Exceptional Children’s advanced standards; thus transcript reviews will be conducted.

SPED 511  Identification and Assessment of Young Children with Special Needs  3
SPED 523  Assessment in Gifted/Talented Education  3
SPED 551  Advanced Assessment in Special Education  3
SPED 567  Assessment in Autism Spectrum Disorder  3
SPED 558  Multi-Tier System of Supports  2
SPED 578  Behavior Management  3
T&L 534  Basic Reading Diagnosis and Remediation  2
T&L 583  Reading Clinic  2
T&L 535  Advanced Reading/Language Arts Diagnosis and Remediation  2
T&L 550  Assessment and Evaluation in ELL Education  3

Teacher Education Required Courses (21 credits)

T&L 539  College Teaching  3
T&L 544  Assessment in Higher Education  3
T&L 545  Adult Learners  3
T&L 548  The Professoriate  3
T&L 571  Teacher Education  3
T&L 572  Teacher Education: Focus on the Learner  3
EFR 506  Multicultural Education  3

Elective credits can be selected from graduate courses in other specializations and from the Educational Foundations and Research (EFR) program in consultation with advisor.

Doctor of Philosophy in Teaching and Learning

Admission Requirements

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

Applicants should anticipate that the materials they submit will be held to high standards with the following basic expectations:

1. Graduate grade point average of 3.5 and above
2. Excellent writing skills
3. Three letters of recommendation that address your academic ability, professional accomplishments related to your field of study, and positive character traits
4. A statement of clear professional/educational goals that can be met by our program as specified in the graduate catalog

Your application must also include the following:

1. Transcripts
2. Professional resume
3. Essay. An original essay not to exceed four double-spaced pages (exclusive of references) on a controversial issue or a problem facing education today. The writing will be reviewed for:
   a. overall suitability for doctoral level study;
   b. cohesive development of ideas;
   c. support for ideas; and
   d. writing conventions. The applicant must also sign a statement attesting that the work submitted was that of the applicant.
4. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

Students with a master’s degree in the content field and without previous background in the study of education are eligible for admission to the Ph.D. program with the higher education area of emphasis option.

Degree Requirements

Students seeking the Doctor of Philosophy degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Teaching and Learning Department.

1. Completion of 90 semester credits beyond the baccalaureate degree
2. Maintenance of at least a 3.0 GPA for all classes completed as a graduate student.
3. With approval of a student’s Faculty Advisory Committee, up to one-half of the work beyond a master’s degree (maximum of 30 semester credit hours) may be transferred from another institution that offers post-master’s degrees in the discipline.
4. At least one-half of the work must be in the major field, including:
   - At least 10 credits of dissertation, which incorporates independent work that is an original contribution to knowledge in the field
   - A minimum of 6 credits in the Foundations of Education
   - A minimum of 12 credits of scholarly tools
   - At least 12 credits of a minor or cognate in a supporting area
5. Meet one of the three residency options described below.

Residency Requirements for Doctoral Programs

The purpose of residency is to provide an opportunity for sustained and concentrated intellectual effort, to provide for immersion in a research environment, and to permit extensive interaction with fellow students and faculty of the major department.

The residency for programs in education is designed to provide the student with the experiences outlined by the School of Graduate Studies. It is expected that students will engage in serious scholarship and will reflect on their learning and experiences. The expectation is that the students will integrate their doctoral study in order that the program of study they pursue will become a holistic and unified experience. (The residency option is normally declared on the student’s program of study.) The education faculty has outlined some of the conditions required for these goals to be realized. A doctoral student in Teaching and Learning can meet the residency requirement in any one of these ways:

- Students will complete a residency while enrolled in a minimum of 9 semester hours of credit during each of two consecutive semesters (Fall, Spring or Spring, Fall). Students in this option are encouraged, but are not required, to enroll in a Doctoral Seminar during their residency or at another time in the program. If a student is a GRA, GSA, or GTA, the number of credits that the student may take for this option is less and specified in the catalog.
- Students will complete a residency while enrolled in a minimum of eight semester hours of credit during each of three consecutive summer sessions and in a minimum of two Doctoral Seminars following their first and second or third summers in residence.
- Students will complete a residency over a period of three consecutive years of continuous enrollment in a minimum of 36 semester hours of credit (12 credits per year for 3 years) to include a minimum of two Doctoral Seminars during the period of residency.

Curriculum and Instruction

M.S. in Curriculum & Instruction (p. 400)
Courses

T&L 511. Assessment in ECE. 3 Credits.
This course examines the construct and practice of assessment for teaching in birth to third-grade learning environments. The course considers the critical issues related to assessment and accountability in schools, focusing on why assessment is necessary, who the various assessment audiences are, what kind of assessment information is useful for each, and the time frame appropriate for such assessment information. Students study a variety of assessment methods currently used to evaluate teaching and learning in classrooms. They also discuss ways to communicate formative information about student progress to families, collaborate with colleagues to use assessment results to modify grade-level curricula for children with diverse abilities, and advocate for culturally, linguistically, and developmentally-appropriate forms of assessment. SS.

T&L 513. Linguistics for ELL Teachers. 3 Credits.
This course introduces the complexities of human language through the study of phonetics, phonology, morphology, syntax and semantics. Additional topics addressed include the brain and language, history of the English language, psycholinguistics, writing systems and language in social contexts. SS.

T&L 514. Introduction to Multilingual Education. 3 Credits.
This course explores language education models, programs and policies with an emphasis on English language learners (ELLs). Political, legal, historical, and cultural contexts of multilingual education will be discussed with a focus on both U.S. and global challenges.

T&L 515. Middle School Curriculum. 3 Credits.
This course examines the middle school curriculum and instructional strategies as well as the needs of early adolescents. The course focuses on the roles teachers play in incorporating a guided, interdisciplinary, collaborative team approach. The studies include the components of curriculum planning, advisory, exploration, learning communities and instruction (differentiation, cooperative learning, learning styles, instructional strategies) incorporated in middle schools.

T&L 516. Philosophy and Foundations of Middle School Education. 3 Credits.
This course examines the historical and philosophical background of middle level education. The focus is on the roles teachers/administrators play in incorporating this guided, interdisciplinary, collaborative team approach that assists students during these fundamentally transformative years. The course looks at the philosophical aspect of the curriculum and instructional component. The studies explore contemporary issues associated with the middle school as well as the adaptations necessary for special circumstances affiliated with middle schools.

T&L 517. Social Emotional Learning & Guidance. 3 Credits.
This course is designed to offer strategies for caregivers to support young children's positive social and emotional development, behavior, and learning through the exploration of how early experiences shape development. The emotional and social development of children, including the causes, expressions, prevention and management of challenging behaviors in all children birth to age eight are examined. Emphasis is placed on caregiver/family/child relationships, positive emotional/social environments, developmental implications, adverse childhood risk factors, and intervention strategies. Students will identify factors influencing emotional/social development, utilize screening measures, and design positive behavioral supports. SS.

T&L 518. Science in the Elementary School. 3 Credits.
A study of current trends and practices associated with teaching and assessing inquiry-based science in elementary classrooms.

T&L 519. Social Studies in the Elementary School. 3 Credits.
A study of current trends and practices associated with teaching and assessing social studies in elementary classrooms.

T&L 520. Curriculum and Instruction in the Elementary School. 4 Credits.
A study of processes for planning, implementing, and evaluating curriculum and improving instruction in elementary schools.

T&L 521. Differentiated Instruction. 3 Credits.
An introduction to the principles of differentiated instruction. Topics of study include: brain-based learning, responsive instructional and assessment strategies, linking curriculum standards to learner needs, organizing and managing a differentiated classroom, and relevant resources for implementation.

T&L 522. Mathematics in the Elementary School. 3 Credits.
A study of current trends and practices associated with teaching and assessing inquiry-based math in elementary classrooms.

T&L 523. Literacy Instruction for English Language Learners. 3 Credits.
This course addresses the foundations of teaching English language and literacy to English Language Learners (ELLs). Topics will include practices for reading and writing instruction, vocabulary development, assessment of reading and writing, choosing literature for ELLs, and the incorporation of media and technology in ELL literacy instruction. SS.

T&L 524. Reading in the Content Areas. 2 Credits.
How and why reading should be taught in the content areas (i.e. Social Studies, Science, Mathematics, etc.). Research studies in the field of content reading and a variety of instructional practices are reviewed.

T&L 525. Writing in the Classroom. 3 Credits.
This course examines writing as a process that is developmental, cultural, social, and individual. Emphasis is on effective implementation of the essential structures of writing workshop and on monitoring and assessing writers' growth.

T&L 526. Play in Development and Early Childhood Education. 3 Credits.
This course explores the role of play in cognitive, physical and social-emotional development, and the way in which play is incorporated into educational and other programmatic settings. Students will explore how assessment of play indicates a child's development, and will use assessment to promote Developmentally Appropriate Practices (DAP) for PreK-Grade 3 (ages 3-8) learners.

T&L 527. Curricular Foundations in Early Childhood Education. 3 Credits.
This course examines the historical, philosophical, cultural, race, class, and gender influences on curriculum in early childhood, including the philosophy and mission of the Department of Teaching and Learning.

T&L 528. Children's and Young Adult Literature in the Classroom. 3 Credits.
This course explores the major area of literature for children and young adults in response to two questions: What is the range of literature available for children and young adults today? In what ways might children's and young adult literature be used in the classroom to promote literacy growth? SS.

T&L 529. Language Development & Cognition in Children. 3 Credits.
This course provides foundational information about language and cognitive development in children. The course content will also analyze typical and atypical language and cognitive development. The focus of the course will include children birth to age eight.

T&L 530. Foundations of Reading Instruction. 3-4 Credits.
This course focuses on the relationship between reading theory, research, contemporary issues and instructional practice. Emphasis is placed on strategic systems related to effective reading, instructional approaches that support the development of these strategic systems and assessment as collecting evidence of effective reading behaviors.

T&L 531. Early Literacy Development and Instruction. 3 Credits.
A study of early literacy processes including phonemic and print awareness, word recognition, comprehension, and writing. Emphasis is on reviewing current research and theory, assessment and instruction practices, and bridging language and literacy development in literacy rich environments.

T&L 532. Leadership in Literacy. 3 Credits.
The role of the literacy coach is to support teachers in closing the gap between learners’ performance and achievement in reading and writing. Topics in this course will include providing leadership for a school's literacy program, collaboration with teachers and administrators, curriculum issues, knowledge of literacy standards, and professional development facilitation. On demand.

T&L 533. Secondary English Language Arts & Literacy Instruction. 3 Credits.
This graduate level course explores teaching literacy in the English Language Arts middle and high school classroom. Students will explore how the traditional and contemporary approaches to teaching literature, nonfiction, and digital media work to support the advanced literacy goals of reading, writing, listening and speaking for adolescents. Students will explore Language Arts instructional methods and develop curriculum in the areas of literature, writer's workshop, academic inquiry, language vocabulary, and digital literacy. Students will also explore the ways the literacy program is supported and assessed throughout the entire secondary school. SS.

T&L 534. Basic Reading Diagnosis and Remediation. 2 Credits.
Focuses on common causes of reading disability, methods of diagnosis, and corrective reading programs in the classroom. Corequisite: T&L 583.
T&L 535. Advanced Reading/Language Arts Diagnosis and Remediation. 2 Credits.
Analysis of interrelationships of learning difficulties in language arts areas and procedures for remediation. Prerequisites: T&L 530 and T&L 534.

T&L 536. Innovations in English Language Arts Instruction. 3 Credits.
This course considers the current curricular trends and research-based best practices in teaching English Language Arts. Students will critically examine and apply current instructional approaches in teaching English language and vocabulary, classroom discourse practices, and digital literacies. We will consider the ways various instructional methods support the advancement of literacy development for all students, considering ways to modify and adapt curriculum to meet the cultural and linguistic diversity of today's classrooms. On demand.

T&L 537. ELL Methods and Materials. 3 Credits.
This course explores current methods and materials in ELL education, with a focus on teaching academic language and sheltered content instruction. F,S,SS.

T&L 538. Supervision of Student Teaching. 2 Credits.
For supervisors and directors of student teaching in colleges and cooperating schools. Principles and practices on how to provide the most beneficial experiences for student teachers.

T&L 539. College Teaching. 3 Credits.
Explores learning styles and teaching styles, the components and responsibilities involved in college teaching, methods of teaching and motivating students, and current issues related to instruction in the college classroom.

T&L 540. Theory and Philosophies of Curriculum in Schools. 3 Credits.
This course explores the historical development of the K-12 curriculum, the philosophical and theoretical aspects applied to curriculum, and the social conditions that impact curriculum.

T&L 541. History of Higher Education in the United States. 3 Credits.
Study of major events and people shaping higher education in the U.S. Role, philosophy, and organization of institutions of higher education discussed.

T&L 542. Models of Teaching. 3 Credits.
This course focuses on various models of teaching: social interaction, information-processing, inquiry and behavioral. The purpose of the course is to provide teachers with a variety of instructional models related to meaningful learning experiences for students.

T&L 543. Scholarly Writing. 3 Credits.
Designed to assist students with learning the art of scholarly writing, this course will aid students in designing, formatting, and completing research-based and other scholarly writing projects, as well as understanding the rules and norms of academic publishing.

T&L 544. Assessment in Higher Education. 3 Credits.
A wide range of assessment issues in higher education will be explored. This includes course, program, and institutional assessment as well as classroom assessment techniques. Students will examine and understand the assessment process.

T&L 545. Adult Learners. 3 Credits.
This course will cover theories of adult development, current research on adult learners, ways of assessing the needs and interests of adult learners, and ways of creating environments in which adult learners can thrive.

T&L 546. College Students with Special Needs. 3 Credits.
This course explores the range of special needs college students bring to campus and how faculty, staff, and administrators might appropriately meet those needs. Prerequisite: Admission to the School of Graduate Studies or instructor permission. S.

T&L 547. Technology in Higher Education. 3 Credits.
Students will examine the various uses and integration of technology and media in higher education by faculty in their attempt to engage learners with each other, the course content, and with instructors.

T&L 548. The Professoriate. 3 Credits.
This course is a study of the development of the American professoriate by way of historical, scholarly, popular, and contemporary perspectives. It also examines the transition of new faculty members to their initial academic appointment.

T&L 549. Seminar. 1-4 Credits.
The seminar will focus on a specific topic relating to teaching and learning. The specific content will vary depending upon student needs and faculty resources. Repeatable. S/U grading.

T&L 550. Assessment and Evaluation in ELL Education. 3 Credits.
This course combines readings and theoretical discussion of assessment with hands-on experience in assessing ELLs. Students will learn how to use a variety of formal and informal assessments with a focus on how to use assessment data in planning instruction. Topics will include classroom-based assessments, language proficiency testing, testing accommodations for ELLs, and assessment of ELLs for special education and gifted education, and ELL program evaluation.

T&L 551. Second Language Acquisition for ELL Teachers. 3 Credits.
This course will explore the socio- and psycho-linguistic aspects of interlanguage by studying the theories and research of first and second language acquisition. Students will examine the nature of learners and their individual differences during the stages of language development, with a focus on children and K-12 classrooms.

T&L 553. Collaborative Relationships: Home, School and Community. 3 Credits.
A course appropriate for anyone working with families, early childhood educators, general educators, special educators, related service personnel, administrators and outside agency personnel. Topics covered include: (1) the various models of collaboration and consultation and the stages of each; (2) communication skills; (3) problem-solving; (4) conflict management; (5) diverse perspectives; (6) information collection procedures; (7) supervisory skills; (8) family characteristics and structure across the lifespan; (9) family focused interventions; (10) school choices; and (11) school issues such as poverty, domestic violence, teasing, bullying, and school violence.

T&L 555. Middle School Science and Engineering Lab1:Solids. 2 Credits.

T&L 559A. MS Sci.Eng-2: Solids. 3 Credits.
Prerequisites: T&L 558, admission to Graduate School, ND Teacher licensure and Admission to program "Improving Math and Science Literacy of Middle and High School Students of North Dakota Through Teacher-Faculty Partnerships".

T&L 559B. MS Sci.Eng-2: Solids. 3 Credits.
Prerequisites: T&L 558, admission to Graduate School, ND Teacher licensure and Admission to program "Improving Math and Science Literacy of Middle and High School Students of North Dakota Through Teacher-Faculty Partnerships".

T&L 566. Brain in Memory and Learning. 3 Credits.
Prerequisite: Admissions to Grad School.

T&L 567. Language Structure and Analysis for ELL Teachers. 3 Credits.
This course explores the grammatical and discourse structures of the modern English language, analysis of grammar and discourse with a focus on specific problem areas for ELLs, and pedagogical implications for English language development.

T&L 568. Research and Advocacy in TESOL. 3 Credits.
This course prepares teachers to both understand and conduct research in TESOL. Emphasis will be placed on using research data to advocate for changes and improvement in ELL education.

T&L 569. Action Research. 3 Credits.
The study of the philosophy and methods of action research. Emphasis is focused on analysis of and reflection on one’s teaching for the purpose of improvements in student learning. Prerequisite: Graduate status. S.

T&L 571. Teacher Education. 3 Credits.
Practices, issues, and trends in the design and implementation and assessment of programs for the preparation and development of K-12 teachers.

T&L 572. Teacher Education: Focus on the Learner. 3 Credits.
The study of teacher education in relation to the lives of P-12 students. This course includes the examination of children and their lives through aspects of race, religion, socioeconomics, linguistics and age, and considers educational implications for preservice and inservice teachers.

T&L 573. Middle School Science and Engineering Lab2:Liq/Gas. 2 Credits.

T&L 574. MS Sci.Eng-4: Liquid/Gas. 3 Credits.
Prerequisites: T&L 573, admission to Graduate School, ND Teacher licensure and Admission to program "Improving Math and Science Literacy of Middle and High School Students of North Dakota Through Teacher-Faculty Partnerships".
T&L 575. Middle School Science and Engineering Lab3:Mot/Elec. 2 Credits.

T&L 576A. MS Sci.Eng.-6:Motion/Electric. 3 Credits.
Prerequisites: T&L 575, admission to Graduate School, ND Teacher Licensure and employment as a teacher in a ND school.

T&L 576B. MS Sci.Eng.-6:Motion/Electric. 3 Credits.
Prerequisite: T&L 576A.

T&L 577. Assessment of Learning. 3 Credits.
This course addresses the theory and practice of assessment, specifically the process of gathering and discussing information from multiple and diverse sources in order to develop a deep understanding of what students know, understand, and can do with their knowledge as a result of educational experiences.

T&L 579. Classroom Based Inquiry. 3 Credits.
Concepts learned in T&L 569 will be looked at in-depth and theoretical constructs such as Living Theory, Self Study, and Critical Theory constructs will be studied. Students plan and conduct an in-depth inquiry project within a school setting, complete the associated IRB, and create and academic poster and/or prepare a proposal of the Inquiry project for a professional setting.
Prerequisites: TL graduate status and T&L 569; or by permission of instructor.
F,S.

T&L 580. Practicum in Schools. 1-4 Credits.
Practicum in study of desirable school practices, observations in nearby schools, and application of research findings in solving practical problems.
Prerequisites: Appropriate foundational and major area courses, and consent of the instructor and advisor. Repeatable.

T&L 581. Resident Internship. 4 Credits.
A full-time, year-long internship experience conducted in a cooperating school district. Interns are assigned as members of instructional teams with full responsibility for a portion of the cooperating school's instructional program.
Prerequisites: Participation in the summer program prior to the internship and teaching licensure (see dept for approval).

T&L 582. Resident Internship. 4 Credits.
A full-time, year-long internship experience conducted in a cooperating school district. Interns are assigned as members of instructional teams with full responsibility for a portion of the cooperating school's instructional program.
Prerequisites: Participation in the summer program prior to the internship and teaching licensure (see dept for approval).

T&L 583. Reading Clinic. 2 Credits.

T&L 584. Internship in Education. 1-8 Credits.
This is a culminating experience primarily for Sixth year and Doctoral students. The internships will be identified in one of the following sub-areas: (A) Educational Administration, (B) Special Education, (C) Curriculum, (D) Educational Research, or (E) Teacher Education. Prerequisites: Appropriate foundational, cognate, and major area coursework and consent of advisor and instructor. Repeatable.

T&L 589. Professional Development: Resident Teacher Program. 2 Credits.
This field-based experience provides mentoring and coaching, translates baccalaureate theory and research into practice, and requires active participation in the school placement and classroom setting. Issues and topics relevant to first year teachers and graduate education are emphasized through field work and discussions. Prerequisite: Admission into the Elementary Education Resident Teacher Program. SS.

T&L 590. Special Topics. 1-4 Credits.
Exploration of special topics in the study of education not regularly included in available course offerings. May be repeated for different topics. Prerequisite: Consent of instructor or advisor. Repeatable.

T&L 591. Readings in Education. 1-4 Credits.
Designed primarily for advanced graduate students. May be repeated for different topics. Prerequisite: Consent of instructor and advisor. Repeatable.

T&L 593. Independent Projects. 1-4 Credits.
Repeatable.

T&L 596. Individual Research in Education. 1-4 Credits.
Prerequisite: Consent of instructor and advisor. Repeatable.
Admission Process
1. Complete the School of Graduate Studies online application.
2. Submit the application fee of $35.
3. Identify three individuals who will complete the recommendation form: a) an education supervisor or administrator; b) a professional colleague or university professor; 3) a person of your choosing.
4. Send official transcripts from each institution attended to the School of Graduate Studies.
5. Complete the personal statement and attach it in the essay section of the online application. The personal statement should address three prompts and should be no more than 5 double-spaced pages.
   • Provide a narrative describing your chronological history of all professional teaching and administration experience, as well as academic honors or achievements you have earned.
   • What are the characteristics, attitudes, values, and/or skills that you think will make you a good candidate for your professional role?
   • Describe several personal and professional goals you would like to achieve in the next five years. Include in your description reasons why these goals are important to you.

Degree Requirements
Students must satisfy all general requirements established by the School of Graduate Studies as well as specific requirements established for the major in Curriculum and Instruction.

1. A minimum of 32 credits including credits required for the Curriculum and Instruction major for those who have earned a bachelor's degree and teaching license.
2. A maximum of one-fourth of the credit hours maybe transferred from another institution, depending on the courses and grades.
3. Two credits of Scholarly Project (T&L 995) or Independent Study (T&L 997) or four credits of Thesis (T&L 998).
5. Six credits of electives for the major (e.g., EFR 500 Foundations of Educational Thought, T&L 521 Differentiated Instruction, T&L 590 Special Topics: Technology in the Schools; T&L 524 Reading in the Content Areas, EFR 506 Multicultural Education).
6. Five to six credits of scholarly tools (e.g., T&L 569 Action Research, T&L 579 Classroom Based Inquiry, EFR 509 Introduction to Educational Research, EFR 515 Statistics I).
7. Nine credits of course work that complements the major in Curriculum and Instruction (e.g., content courses in a discipline or coursework in another education program).

Track 1 Sample Program of Study
Requirements for the Major Track 1 (Core – 11-13 Credits)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>T&amp;L 540</td>
<td>Theory and Philosophies of Curriculum in Schools</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 542</td>
<td>Models of Teaching</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 577</td>
<td>Assessment of Learning</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 995</td>
<td>Scholarly Project</td>
<td>2</td>
</tr>
<tr>
<td>or</td>
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<tr>
<td>T&amp;L 997</td>
<td>Independent Study</td>
<td>2</td>
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<tr>
<td>or</td>
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<tr>
<td>T&amp;L 998</td>
<td>Thesis</td>
<td>1-9</td>
</tr>
</tbody>
</table>

Electives for the Major (6 Credits from the following or courses approved by an advisor)

<table>
<thead>
<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>EFR 500</td>
<td>Introduction to the Foundations of Education</td>
<td>3</td>
</tr>
<tr>
<td>EFR 506</td>
<td>Multicultural Education</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 521</td>
<td>Differentiated Instruction</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 524</td>
<td>Reading in the Content Areas</td>
<td>2</td>
</tr>
<tr>
<td>T&amp;L 590</td>
<td>Special Topics</td>
<td>1-4</td>
</tr>
</tbody>
</table>

Research (6 credits from the following)

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</thead>
<tbody>
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<td>3</td>
</tr>
<tr>
<td>T&amp;L 579</td>
<td>Classroom Based Inquiry</td>
<td>3</td>
</tr>
<tr>
<td>EFR 509</td>
<td>Introduction to Applied Educational Research</td>
<td>3</td>
</tr>
<tr>
<td>EFR 515</td>
<td>Statistics I</td>
<td>3</td>
</tr>
</tbody>
</table>

Electives – Cognate (9 credits)

Choose 9 credits of coursework that complements the major

Track 2: Initial Licensure Option
A four-year bachelor’s degree with a major or minor in a license-able content area for secondary education.

1. Cumulative undergraduate grade point average (GPA) of 2.75 or at least 3.00 GPA for the junior and senior years of undergraduate degree (based on A=4.0).
2. Applicants must satisfy the School of Graduate Studies’ English Language Proficiency requirements as listed in the Graduate Academic Information section of the graduate catalog. Students who have received a bachelor’s degree in the United States or English-speaking Canada are not required to submit the TOEFL.

Degree Requirements
Students must satisfy all general requirements established by the School of Graduate Studies as well as specific requirements established for the major in Curriculum and Instruction with preparation for initial licensure.

A minimum of 32 credits including:

1. Five credits of Instructional Methods including 3 credits of Methods and Models of Teaching, which includes credits of content specialized methods of instruction.
2. Six credits of human relations and cultural diversity
3. Six credits of research
4. One credit of Field Experience
5. Six credits in Internship which includes 10 weeks of student teaching in the classroom.
6. Two credits of Scholarly Project (T&L 995)
7. Three credits of Technology Integration- Designing Blended Learning
8. Three credits of inclusive education

Sample Program of Study Requirements for the Major Track 2 (Core - 26 Credits)

<table>
<thead>
<tr>
<th>Introduction to Teaching and Learning</th>
<th>T&amp;L 433</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>T&amp;L 542</td>
<td>Models of Teaching (Specialized Instruction Methods)</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 590</td>
<td>Special Topics (Specialized Instruction Methods)</td>
<td>2</td>
</tr>
<tr>
<td>SPE 552</td>
<td>Inclusive Methods (Specialized Instruction Methods)</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 580</td>
<td>Practicum in Schools (field experience)</td>
<td>1</td>
</tr>
<tr>
<td>T&amp;L 584</td>
<td>Internship in Education (10 weeks)</td>
<td>6</td>
</tr>
<tr>
<td>T&amp;L 590</td>
<td>Special Topics (Technology Integration: Designing Blended Learning)</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 995</td>
<td>Scholarly Project</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>26</td>
<td></td>
</tr>
</tbody>
</table>

Research (6 credits from the following):

| T&L 569 | Action Research | 3 |
| T&L 577 | Assessment of Learning | 3 |

Early Childhood Education
M.S. in Early Childhood Education (p. 404)
Courses

T&L 511. Assessment in ECE. 3 Credits.
This course examines the construct and practice of assessment for teaching in birth to third-grade learning environments. The course considers the critical issues related to assessment and accountability in schools, focusing on why assessment is necessary, who the various assessment audiences are, what kind of assessment information is useful for each, and the time frame appropriate for such assessment information. Students study a variety of assessment methods currently used to evaluate teaching and learning in classrooms. They also discuss ways to communicate formative information about student progress to families, collaborate with colleagues to use assessment results to modify grade-level curricula for children with diverse abilities, and advocate for culturally, linguistically, and developmentally-appropriate forms of assessment. SS.

T&L 513. Linguistics for ELL Teachers. 3 Credits.
This course introduces the complexities of human language through the study of phonetics, phonology, morphology, syntax and semantics. Additional topics addressed include the brain and language, history of the English language, psycholinguistics, writing systems and language in social contexts. SS.

T&L 514. Introduction to Multilingual Education. 3 Credits.
This course explores language education models, programs and policies with an emphasis on English language learners (ELLs). Political, legal, historical, and cultural contexts of multilingual education will be discussed with a focus on both U.S. and global challenges.

T&L 515. Middle School Curriculum. 3 Credits.
This course examines the middle school curriculum and instructional strategies as well as the needs of early adolescents. The course focuses on the roles teachers play in incorporating a guided, interdisciplinary, collaborative team approach. The studies include the components of curriculum learning, advisory, exploration, learning communities and instruction (differentiation, cooperative learning, learning styles, instructional strategies) incorporated in middle schools.

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This course examines the historical and philosophical background of middle level education. The focus is on the roles teachers/administrators play in incorporating this guided, interdisciplinary, collaborative team approach that assists students during these fundamentally transformative years. The course looks at the philosophical aspect of the curriculum and instructional component. The studies explore contemporary issues associated with the middle school as well as the adaptations necessary for special circumstances affiliated with middle schools.

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This course is designed to offer strategies for caregivers to support young children's positive social and emotional development, behavior, and learning through the exploration of how early experiences shape development. The emotional and social development of children, including the causes, expressions, prevention and management of challenging behaviors in all children birth to age eight are examined. Emphasis is placed on caregiver/family/child relationships, positive emotional/social environments, developmental implications on the role of these factors, and intervention strategies. Students will identify factors influencing emotional/social development, utilize screening measures, and design positive behavioral supports. SS.

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A study of current trends and practices associated with teaching and assessing inquiry-based science in elementary classrooms.

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A study of current trends and practices associated with teaching and assessing social studies in elementary classrooms.

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A study of processes for planning, implementing, and evaluating curriculum and improving instruction in elementary schools.

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An introduction to the principles of differentiated instruction. Topics of study include: brain-based learning, responsive instructional and assessment strategies, linking curriculum standards to learner needs, organizing and managing a differentiated classroom, and relevant resources for implementation.

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How and why reading should be taught in the content areas (i.e. Social Studies, Science, Mathematics, etc.). Research studies in the field of content reading and a variety of instructional practices are reviewed.

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This course examines the historical, philosophical, cultural, race, class, and gender influences on curriculum in early childhood, including the philosophy and mission of the Department of Teaching and Learning.

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The role of the literacy coach is to support teachers in closing the gap between learners’ performance and achievement in reading and writing. Topics in this course will include providing leadership for a school's literacy program, collaboration with teachers and administrators, curriculum issues, knowledge of literacy standards, and professional development facilitation. On demand.
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Focuses on common causes of reading disability, methods of diagnosis, and corrective reading programs in the classroom. Corequisite: T&L 583.

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Analysis of interrelationships of learning difficulties in language arts areas and procedures for remediation. Prerequisites: T&L 530 and T&L 534.

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A course appropriate for anyone working with families, early childhood educators, general educators, special educators, related service personnel, administrators and outside agency personnel. Topics covered include: (1) the various models of collaboration and consultation and the stages of each; (2) communication skills; (3) problem-solving; (4) conflict management; (5) diverse perspectives; (6) information collection procedures; (7) supervisory skills; (8) family characteristics and structure across the lifespan; (9) family focused intervention; (10) school choices; and (11) school issues such as poverty, domestic violence, teasing, bullying, and school violence.

T&L 558. Middle School Science and Engineering Lab 1: Solids. 2 Credits.

T&L 559A. MS Sci.Eng-2: Solids. 3 Credits.
Prerequisites: T&L 558, admission to Graduate School, ND Teacher licensure and Admission to program "Improving Math and Science Literacy of Middle and High School Students of North Dakota Through Teacher-Faculty Partnerships".

T&L 559B. MS Sci.Eng-2: Solids. 3 Credits.
Prerequisites: T&L 558, admission to Graduate School, ND Teacher licensure and Admission to program "Improving Math and Science Literacy of Middle and High School Students of North Dakota Through Teacher-Faculty Partnerships".

T&L 566. Brain in Memory and Learning. 3 Credits.
Prerequisite: Admissions to Grad School.

T&L 567. Language Structure and Analysis for ELL Teachers. 3 Credits.
This course explores the grammatical and discourse structures of the modern English language, analysis of grammar and discourse with a focus on specific problem areas for ELLs, and pedagogical implications for English language development.

T&L 568. Research and Advocacy in TESOL. 3 Credits.
This course prepares teachers to both understand and conduct research in TESOL. Emphasis will be placed on using research data to advocate for changes and improvement in ELL education.

T&L 569. Action Research. 3 Credits.
The study of the philosophy and methods of action research. Emphasis is focused on analysis of and reflection on one's teaching for the purpose of improvements in student learning. Prerequisite: Graduate status. S.
T&L 571. Teacher Education. 3 Credits. Practices, issues, and trends in the design and implementation and assessment of programs for the preparation and development of K-12 teachers.

T&L 572. Teacher Education: Focus on the Learner. 3 Credits. The study of teacher education in relation to the lives of P-12 students. This course includes the examination of children and their lives through aspects of race, religion, socioeconomic, linguistic and age, and considers educational implications for preservice and inservice teachers.

T&L 573. Middle School Science and Engineering Lab2: Liq/Gas. 2 Credits.

T&L 574. MS Sci.Eng.-4: Liquid/Gas. 3 Credits. Prerequisites: T&L 573, admission to Graduate School, ND Teacher licensure and Admission to program "Improving Math and Science Literacy of Middle and High School Students of North Dakota Through Teacher-Faculty Partnerships".

T&L 575. Middle School Science and Engineering Lab3: Mot/Elec. 2 Credits.

T&L 576A. MS Sci.Eng.-6: Motion/Electric. 3 Credits. Prerequisites: T&L 575, admission to Graduate School, ND Teacher Licensure and employment as a teacher in a ND school.

T&L 576B. MS Sci.Eng.-6: Motion/Electric. 3 Credits. Prerequisites: T&L 576A.

T&L 577. Assessment of Learning. 3 Credits. This course addresses the theory and practice of assessment, specifically the process of gathering and discussing information from multiple and diverse sources in order to develop a deep understanding of what students know, understand, and can do with their knowledge as a result of educational experiences.

T&L 579. Classroom Based Inquiry. 3 Credits. Concepts learned in T&L 569 will be looked at in-depth and theoretical constructs such as Living Theory, Self Study, and Critical Theory constructs will be studied. Students plan and conduct an in-depth inquiry project within a school setting, complete the associated IRB, and create and academic poster and/or prepare a proposal of the Inquiry project for a professional setting.

Prerequisites: T&L 579. Graduate status and T&L 569; or by permission of instructor. F.S.

T&L 580. Practicum in Schools. 1-4 Credits. Practicum in study of desirable school practices, observations in nearby schools, and application of research findings in solving practical problems. Prerequisites: Appropriate foundational and major area courses, and consent of the instructor and advisor. Repeatable.

T&L 581. Resident Internship. 4 Credits. A full-time, year-long internship experience conducted in a cooperating school district. Interns are assigned as members of instructional teams with full responsibility for a portion of the cooperating school's instructional program.

Prerequisites: T&L 579. Graduate status and T&L 569; or by permission of instructor. F.S.

T&L 582. Resident Internship. 4 Credits. A full-time, year-long internship experience conducted in a cooperating school district. Interns are assigned as members of instructional teams with full responsibility for a portion of the cooperating school's instructional program.

Prerequisites: T&L 579. Graduate status and T&L 569; or by permission of instructor. F.S.


T&L 584. Internship in Education. 1-8 Credits. This is a culminating experience primarily for Sixth year and Doctoral students. The internships will be identified in one of the following sub-areas: (A) Educational Administration, (B) Special Education, (C) Curriculum, (D) Educational Research, or (E) Teacher Education. Prerequisites: T&L 579. Graduate status and T&L 569; or by permission of instructor. F.S.

T&L 585. Professional Development: Resident Teacher Program. 2 Credits. This field-based experience provides mentoring and coaching, translates baccalaureate theory and research into practice, and requires active participation in the school placement and classroom setting. Issues and topics relevant to first year teachers and graduate education are emphasized through field work and discussions. Prerequisite: Admission into the Elementary Education Resident Teacher Program. SS.

T&L 590. Special Topics. 1-4 Credits. Exploration of special topics in the study of education not regularly included in available course offerings. May be repeated for different topics. Prerequisite: Consent of instructor or advisor. Repeatable.

T&L 591. Readings in Education. 1-4 Credits. Designed primarily for advanced graduate students. May be repeated for different topics. Prerequisite: Consent of instructor and advisor. Repeatable.

T&L 593. Independent Projects. 1-4 Credits. Repeatable.

T&L 596. Individual Research in Education. 1-4 Credits. Prerequisite: Consent of instructor and advisor. Repeatable.

T&L 995. Scholarly Project. 2 Credits. The scholarly project demonstrates critical analysis and application of information and experiences gained throughout the program of study. The project allows students to demonstrate scholarly skills in an integrated manner that is directly related to their roles as teachers, program evaluators, and action researchers. The scholarly project must be approved by the student's adviser.


T&L 997. Independent Study. 2 Credits.

T&L 998. Thesis. 1-9 Credits. Repeatable to 9 credits.


Undergraduate Courses for Graduate Credit

T&L 322. Administration and Leadership in Early Childhood Education. 3 Credits. An investigation of patterns of administration, curriculum organization, spatial resources, and staffing in early childhood settings, serving children 0-8 years old. Topics include federal and state laws and emerging trends in preschool and primary education in the state, region, and nation. Sixteen (16) hours of field experience. Prerequisite: Admission to the Teacher Education program. S.

T&L 422. Development of the Gifted and Talented. 2 Credits. Research and theory for understanding the development needs of the more able child in early childhood and in educational experiences. S.

T&L 423. Assessment and Individualized Planning in Special Education. 3 Credits. A study of the principles and practices of: (1) obtaining diagnostic information on school-related problems of a student; (2) assimilating this information and prescribing appropriate alterations based on continuous measurement data. Prerequisites or Corequisites: T&L 315 and T&L 319. F.S.

T&L 493. Workshop. 1-4 Credits. Special problems in Special Education; consideration of special problems of concern to the Special Education teacher and other educators. Repeatable to 8 credits. F.S.

Master of Science in Early Childhood Education

Admission Requirements

The applicant must meet the School of Graduate Studies' current minimum general admission requirements as published in the graduate catalog.

1. An undergraduate degree in early childhood education, child development, elementary education, or a related field.
2. A cumulative Grade Point Average (GPA) of at least 2.75 for all undergraduate work or a GPA of at least 3.0 for the junior and senior years of undergraduate work (based on A = 4.00).
3. Satisfy the School of Graduate Studies' English Language Proficiency requirements as published in the graduate catalog.
4. Transcripts, recommendations for admission, and a personal statement, i.e., a response to three essay prompts, are part of the School of Graduate Studies and Early Childhood Education application procedure. The personal statement essay should be 2-3 pages in length and the prompts are:
a. What have you already done professionally or personally of which you are proud? Please include a chronological history of all professional teaching and administration experience, as well as academic honors or achievements you earned.
b. What are the characteristics, attitudes, values, and/or skills that you think will make you a good candidate for your professional role?c. Describe several personal and professional goals you would like to achieve in the next five years. Include in your description reasons why these goals are important to you.

Degree Requirements

The M.S. degree in Early Childhood Education is available in two options: non-thesis option and the thesis option. The program of study is developed together with the student's advisor (non-thesis option, 32 credits) or with a student's thesis committee (thesis option, 30 credits).

Non-Thesis Option:

1. Thirty-two credits including credits required for the major.
3. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.
4. All credits must be approved graduate level courses.
5. The program may include just the major, the major and the minor, or the major and a cognate area. The major must include 20 credits from the major department and the minor or cognate must include nine credits.
6. Completion of a two-credit practicum (60 hours) in an early childhood setting.
7. Preparation of a written independent study or scholarly project approved by the faculty adviser.

Thesis Option:

1. A minimum of 30 semester credits in a major field, including the credits granted for the thesis and the research leading to a 4-6-credit T&L 998 Thesis.
2. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.
3. All credits must be approved graduate level courses.
4. The program may include just the major, the major and a minor, or the major and a cognate area. The major must include 20 credits from the major department and a minor or cognate must include nine credits.
5. Preparation and successful defense of a thesis.

This program of graduate study can be completed in 18 months going full-time or 24 months going part-time (two courses per semester). Courses are offered on campus, online and a combination of the two.

Required Courses:

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<thead>
<tr>
<th>Major</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>SPED 510</td>
<td>Introduction to Early Childhood Special Education</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 517</td>
<td>Social Emotional Learning &amp; Guidance</td>
<td>3</td>
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<tr>
<td>T&amp;L 526</td>
<td>Play in Development and Early Childhood Education</td>
<td>3</td>
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<td>T&amp;L 527</td>
<td>Curricular Foundations in Early Childhood Education</td>
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<td>T&amp;L 529</td>
<td>Language Development &amp; Cognition in Children</td>
<td>3</td>
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<td>T&amp;L 530</td>
<td>Foundations of Reading Instruction</td>
<td>3</td>
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<td>T&amp;L 553</td>
<td>Collaborative Relationships: Home, School and Community</td>
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<tr>
<td>T&amp;L 580</td>
<td>Practicum in Schools</td>
<td>3</td>
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<tr>
<td>T&amp;L 995 or T&amp;L 997 or T&amp;L 998</td>
<td>Scholarly Project</td>
<td>2-6</td>
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Scholarly Tools

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<tr>
<td>EFR 509</td>
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</table>

Total Credits: 32

Students are required to take T&L 580 Practicum in Schools. This practicum requires 60 hours in an early childhood setting, which could be the candidate's work setting if it meets required accreditation standards.

Elementary Education

M.S. in Elementary Education (p. 408)
M.Ed. in Elementary Education (p. 408)

Courses

T&L 511. Assessment in ECE. 3 Credits.
This course examines the construct and practice of assessment for teaching in birth to third-grade learning environments. The course considers the critical issues related to assessment and accountability in schools, focusing on why assessment is necessary, who the various assessment audiences are, what kind of assessment information is useful for each, and the time frame appropriate for such assessment information. Students study a variety of assessment methods currently used to evaluate teaching and learning in classrooms. They also discuss ways to communicate formative information about student progress to families, collaborate with colleagues to use assessment results to modify grade-level curricula for children with diverse abilities, and advocate for culturally, linguistically, and developmentally-appropriate forms of assessment.

T&L 513. Linguistics for ELL Teachers. 3 Credits.
This course introduces the complexities of human language through the study of phonetics, phonology, morphology, syntax and semantics. Additional topics addressed include the brain and language, history of the English language, psycholinguistics, writing systems and language in social contexts.

T&L 514. Introduction to Multilingual Education. 3 Credits.
This course explores language education models, programs and policies with an emphasis on English language learners (ELLs), Political, legal, historical, and cultural contexts of multilingual education will be discussed with a focus on both U.S. and global challenges.

T&L 515. Middle School Curriculum. 3 Credits.
This course examines the middle school curriculum and instructional strategies as well as the needs of early adolescents. The course focuses on the roles teachers play in incorporating a guided, interdisciplinary, collaborative team approach. The studies include the components of curriculum teaming, advisory, exploration, learning communities) and instruction (differentiation, cooperative learning, learning styles, instructional strategies) incorporated in middle schools.

T&L 516. Philosophy and Foundations of Middle School Education. 3 Credits.
This course examines the historical and philosophical background of middle level education. The focus is on the roles teachers/administrators play in incorporating this guided, interdisciplinary, collaborative team approach that assists students during these fundamentally transformative years. The course looks at the philosophical aspect of the curriculum and instructional component. The studies explore contemporary issues associated with the middle school as well as the adaptations necessary for special circumstances affiliated with middle schools.

T&L 517. Social Emotional Learning & Guidance. 3 Credits.
This course is designed to offer strategies for caregivers to support young children’s positive social and emotional development, behavior, and learning through the exploration of how early experiences shape development. The emotional and social development of children, including the causes, expressions, prevention and management of challenging behaviors in all children birth to age eight are examined. Emphasis is placed on caregiver/family/child relationships, positive emotional/social environments, developmental implications, adverse childhood risk factors, and intervention strategies. Students will identify factors influencing emotional/social development, utilize screening measures, and design positive behavioral supports.

T&L 518. Science in the Elementary School. 3 Credits.
A study of current trends and practices associated with teaching and assessing inquiry-based science in elementary classrooms.

T&L 519. Social Studies in the Elementary School. 3 Credits.
A study of current trends and practices associated with teaching and assessing social studies in elementary classrooms.
T&L 520. Curriculum and Instruction in the Elementary School. 4 Credits.
A study of processes for planning, implementing, and evaluating curriculum and improving instruction in elementary schools.

T&L 521. Differentiated Instruction. 3 Credits.
An introduction to the principles of differentiated instruction. Topics of study include: brain-based learning, responsive instructional and assessment strategies, linking curriculum standards to learner needs, organizing and managing a differentiated classroom, and relevant resources for implementation.

T&L 522. Mathematics in the Elementary School. 3 Credits.
A study of current trends and practices associated with teaching and assessing inquiry-based math in elementary classrooms.

T&L 523. Literacy Instruction for English Language Learners. 3 Credits.
This course addresses the foundations of teaching English language and literacy to English Language Learners (ELLs). Topics will include practices for reading and writing instruction, vocabulary development, assessment of reading and writing, choosing literature for ELLs, and the incorporation of media and technology in ELL literacy instruction. SS.

T&L 524. Reading in the Content Areas. 2 Credits.
How and why reading should be taught in the content areas (i.e. Social Studies, Science, Mathematics, etc.). Research studies in the field of content reading and a variety of instructional practices are reviewed.

T&L 525. Writing in the Classroom. 3 Credits.
This course examines writing as a process that is developmental, cultural, social, and individual. Emphasis is on effective implementation of the essential structures of writing workshop and on monitoring and assessing writers' growth.

T&L 526. Play in Development and Early Childhood Education. 3 Credits.
This course explores the role of play in cognitive, physical and social-emotional development, and the way in which play is incorporated into educational and other programmatic settings. Students will explore how assessment of play indicates a child's development, and they will use assessment to promote Developmentally Appropriate Practices (DAP) for PreK-Grade 3 (ages 3-8) learners.

T&L 527. Curricular Foundations in Early Childhood Education. 3 Credits.
This course examines the historical, philosophical, cultural, race, class, and gender influences on curriculum in early childhood, including the philosophy and mission of the Department of Teaching and Learning.

T&L 528. Children's and Young Adult Literature in the Classroom. 3 Credits.
This course explores the major area of literature for children and young adults in response to two questions: What is the range of literature available for children and young adults today? In what ways might children's and young adult literature be used in the classroom to promote literacy growth?. SS.

T&L 529. Language Development & Cognition in Children. 3 Credits.
This course provides foundational information about language and cognitive development in children. The course content will also analyze typical and atypical language and cognitive development. The focus of the course will include children birth to age eight.

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Prerequisites: T&L 558, admission to Graduate School, ND Teacher licensure and Admission to program "Improving Math and Science Literacy of Middle and High School Students of North Dakota Through Teacher-Faculty Partnerships”.

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T&L 566. Brain in Memory and Learning. 3 Credits.
Prerequisite: Admissions to Grad School.

T&L 567. Language Structure and Analysis for ELL Teachers. 3 Credits.
This course explores the grammatical and discourse structures of the modern English language, analysis of grammar and discourse with a focus on specific problem areas for ELLs, and pedagogical implications for English language development.

T&L 568. Research and Advocacy in TESOL. 3 Credits.
This course prepares teachers to both understand and conduct research in TESOL. Emphasis will be placed on using research data to advocate for changes and improvement in ELL education.

T&L 569. Action Research. 3 Credits.
The study of the philosophy and methods of action research. Emphasis is focused on analysis of and reflection on one's teaching for the purpose of improvements in student learning. Prerequisite: Graduate status. S.

T&L 571. Teacher Education. 3 Credits.
Practices, issues, and trends in the design and implementation and assessment of programs for the preparation and development of K-12 teachers.

T&L 572. Teacher Education: Focus on the Learner. 3 Credits.
The study of teacher education in relation to the lives of P-12 students. This course includes the examination of children and their lives through aspects of race, religion, socioeconomics, linguistics and age, and considers educational implications for preservice and inservice teachers.

T&L 573. Middle School Science and Engineering Lab II: Liquids/Gas. 2 Credits.
T&L 574. MS Sci.Eng-4: Liquid/Gas. 3 Credits.
Prerequisites: T&L 573, admission to Graduate School, ND Teacher licensure and Admission to program "Improving Math and Science Literacy of Middle and High School Students of North Dakota Through Teacher-Faculty Partnerships”.

T&L 575. Middle School Science and Engineering Lab III: Motion/Electric. 2 Credits.
T&L 576A. MS Sci.Eng.-6: Motion/Electric. 3 Credits.
Prerequisites: T&L 575, admission to Graduate School, ND Teacher Licensure and employment as a teacher in a ND school.

T&L 576B. MS Sci.Eng.-6: Motion/Electric. 3 Credits.
Prerequisite: T&L 576A.

T&L 577. Assessment of Learning. 3 Credits.
This course addresses the theory and practice of assessment, specifically the process of gathering and discussing information from multiple and diverse sources in order to develop a deep understanding of what students know, understand, and can do with their knowledge as a result of educational experiences.

T&L 579. Classroom Based Inquiry. 3 Credits.
Concepts learned in T&L 569 will be looked at in-depth and theoretical constructs such as Living Theory, Self Study, and Critical Theory constructs will be studied. Students plan and conduct an in-depth inquiry project within a school setting, complete the associated IRB, and create and academic poster and/or prepare a proposal of the Inquiry project for a professional setting.
Prerequisites: TL graduate status and T&L 569; or by permission of instructor. F.S.

T&L 580. Practicum in Schools. 1-4 Credits.
Practicum in study of desirable school practices, observations in nearby schools, and application of research findings in solving practical problems.
Prerequisites: Appropriate foundational and major area courses, and consent of the instructor and advisor. Repeatable.

T&L 581. Resident Internship. 4 Credits.
A full-time, year-long internship experience conducted in a cooperating school district. Interns are assigned as members of instructional teams with full responsibility for a portion of the cooperating school's instructional program.
Prerequisites: Participation in the summer program prior to the internship and teaching licensure (see dept for approval).

T&L 582. Resident Internship. 4 Credits.
A full-time, year-long internship experience conducted in a cooperating school district. Interns are assigned as members of instructional teams with full responsibility for a portion of the cooperating school's instructional program.
Prerequisites: Participation in the summer program prior to the internship and teaching licensure (see dept for approval).

T&L 583. Reading Clinic. 2 Credits.

T&L 584. Internship in Education. 1-8 Credits.
This is a culminating experience primarily for Sixth year and Doctoral students. The internships will be identified in one of the following sub-areas: (A) Educational Administration, (B) Special Education, (C) Curriculum, (D) Educational Research, or (E) Teacher Education. Prerequisites: Appropriate foundational, cognate, and major area coursework and consent of advisor and instructor. Repeatable.

T&L 589. Professional Development: Resident Teacher Program. 2 Credits.
This field-based experience provides mentoring and coaching, translates baccalaureate theory and research into practice, and requires active participation in the school placement and classroom setting. Issues and topics relevant to first year teachers and graduate education are emphasized through field work and discussions. Prerequisite: Admission into the Elementary Education Resident Teacher Program. SS.
T&L 590. Special Topics. 1-4 Credits.
Exploration of special topics in the study of education not regularly included in available course offerings. May be repeated for different topics. Prerequisite: Consent of instructor or advisor. Repeatable.

T&L 591. Readings in Education. 1-4 Credits.
Designed primarily for advanced graduate students. May be repeated for different topics. Prerequisite: Consent of instructor and advisor. Repeatable.

T&L 593. Independent Projects. 1-4 Credits.
Repeatable.

T&L 596. Individual Research in Education. 1-4 Credits.
Prerequisite: Consent of instructor and advisor. Repeatable.

T&L 955. Scholarly Project. 2 Credits.
The scholarly project demonstrates critical analysis and application of information and experiences gained throughout the program of study. The project allows students to demonstrate scholarly skills in an integrated manner that is directly related to their roles as teachers, program evaluators, and action researchers. The scholarly project must be approved by the student's adviser.

T&L 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

T&L 997. Independent Study. 2 Credits.
Repeatable to 9 credits.

T&L 998. Thesis. 1-9 Credits.
Repeatable to 9 credits.

T&L 999. Dissertation. 1-15 Credits.
Repeatable to 15 credits.

Undergraduate Courses for Graduate Credit

T&L 322. Administration and Leadership in Early Childhood Education. 3 Credits.
An investigation of patterns of administration, curriculum organization, spatial resources, and staffing in early childhood settings, serving children 0-8 years old. Topics include federal and state laws and emerging trends in preschool and primary education in the state, region, and nation. Sixteen (16) hours of field experience. Prerequisite: Admission to the Teacher Education program. S.

T&L 422. Development of the Gifted and Talented. 2 Credits.
Research and theory for understanding the development needs of the more able child in early childhood and in educational experiences. S.

T&L 423. Assessment and Individualized Planning in Special Education. 3 Credits.
A study of the principles and practices of: (1) obtaining diagnostic information on school-related problems of a student; (2) assimilating this information and prescribing appropriate alterations based on continuous measurement data. Prerequisites or Corequisites: TL 315 and T&L 319. F,S.

T&L 493. Workshop. 1-4 Credits.
Special problems in Special Education; consideration of special problems of concern to the Special Education teacher and other educators. Repeatable to 8 credits. F,S.

Master of Education in Elementary Education

Admission Requirements
The applicant must meet the School of Graduate Studies' current minimum general admission requirements as published in the graduate catalog.

1. Teacher Licensure
2. A cumulative Grade Point Average (GPA) of at least 3.0 for the junior and senior years of undergraduate work (based on A= 4.00).
3. Satisfy the School of Graduate Studies' English Language Proficiency requirements as published in the graduate catalog.

Refer to the Admissions section of the graduate catalog for additional information on admission requirements and application procedures.

Degree Requirements
Licensed persons are eligible for the Master of Education degree. The major portion of the program includes coursework that addresses practical aspects of teaching at the elementary school level—literacy development, mathematics, science, social studies, curriculum development, and working with families. Available courses focus on the relationship between theories of child development and educational practices designed to foster that development. The program culminates in a final paper, project, or thesis.

Non-Thesis Option:
1. Thirty-two (32) credits including credits required for the major.
2. A minimum of three credits of Independent Study
3. At least one-half of the credits must be at or above the 500-level.
4. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.
5. Preparation of a written independent study approved by the faculty advisor.

Thesis Option:
1. A minimum of 30 semester credits in a major field, including the credits granted for the thesis and the research leading to the thesis.
2. At least one-half of the credits must be at or above the 500-level.
3. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.

Required Courses for the Master of Education

Major: Elementary Education

Required Core Courses
T&L 518  Science in the Elementary School 3
T&L 519  Social Studies in the Elementary School 3
T&L 522  Mathematics in the Elementary School 3
T&L 530  Foundations of Reading Instruction 3
T&L 580  Practicum in Schools 1-4

Cognate
T&L 569  Action Research (Recommended) 3
Elective 3

Foundations
EFR 500  Introduction to the Foundations of Education 3
EFR Elective 3

Other Required Coursework
T&L 995  Scholarly Project 2-6
or T&L 997  Independent Study
or T&L 998  Thesis
Electives 3

Total Credits 30-37

Master of Science in Elementary Education

Admission Requirements
The applicant must meet the School of Graduate Studies' current minimum general admission requirements as published in the graduate catalog.

1. Teacher Licensure or a baccalaureate degree
2. A cumulative Grade Point Average (GPA) of at least 2.75 for all undergraduate work or a GPA of at least 3.0 for the junior and senior years of undergraduate work (based on A= 4.00).
3. Satisfy the School of Graduate Studies' English Language Proficiency requirements as published in the graduate catalog.

Refer to the Admissions section of the graduate catalog for additional information on admission requirements and application procedures.
Degree Requirements

Degree requirements for the Master of Science Degree in Elementary Education include:

A detailed description of the M.S. degree may be found in the Degree Requirements section. Scholarly tool requirements are described in the Education departmental section.

The Master of Science Degree in Elementary Education is available in two tracks. Track I, either thesis or non-thesis, is open to licensed or non-licensed persons who wish to follow a research-oriented program of study. Track I requires a minimum of five credits of scholarly tool coursework and allows a maximum three credits of readings.

Track II, available only in the non-thesis option, provides opportunity for non-licensed persons who wish to follow a research-oriented program of study. Track I tracks. Track I, either thesis or non-thesis, is open to licensed or non-licensed persons who wish to follow a research-oriented program of study. Track I requires a minimum of six credits of coursework in Foundations of Education.

Non-Thesis Option:

1. Thirty-two (32) credits including credits required for the major.
2. A minimum of three credits of Independent Study
3. At least one-half of the credits must be at or above the 500-level.
4. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.
5. Preparation of a written independent study approved by the faculty advisor.

Thesis Option:

1. A minimum of 30 semester credits in a major field, including the credits granted for the thesis and the research leading to the thesis.
2. At least one-half of the credits must be at or above the 500-level.
3. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.

Required Courses for the Master of Science

Major: Elementary Education (Track I)

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<tr>
<th>Course Code</th>
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<tr>
<td>T&amp;L 516</td>
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<td>T&amp;L 519</td>
<td>Social Studies in the Elementary School</td>
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<td>T&amp;L 522</td>
<td>Mathematics in the Elementary School</td>
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<td>T&amp;L 530</td>
<td>Foundations of Reading Instruction</td>
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<tr>
<td>T&amp;L 580</td>
<td>Practicum in Schools</td>
<td>1-4</td>
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Electives

Depends on thesis or non-thesis option

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<td>T&amp;L 569</td>
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<td>EFR 509</td>
<td>Introduction to Applied Educational Research</td>
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Other Required Coursework

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<tr>
<td>T&amp;L 995</td>
<td>Scholarly Project</td>
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<td>or T&amp;L 997</td>
<td>Independent Study</td>
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<td>or T&amp;L 998</td>
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Total Credits 24-37

English Language Learners (TESOL)

M.Ed. in ELL Education (p. 412)

Graduate Certificate of TESOL (http://und-public.courseleaf.com/graduateacademicinformation/departmentalcoursesprograms/education/education/ELL)

Courses

T&L 511. Assessment in ECE. 3 Credits.
This course examines the construct and practice of assessment for teaching in birth to third-grade learning environments. The course considers the critical issues related to assessment and accountability in schools, focusing on why assessment is necessary, who the various assessment audiences are, what kind of assessment information is useful for each, and the time frame appropriate for such assessment information. Students study a variety of assessment methods currently used to evaluate teaching and learning in classrooms. They also discuss ways to communicate formative information about student progress to families, collaborate with colleagues to use assessment results to modify grade-level curricula for children with diverse abilities, and advocate for culturally, linguistically, and developmentally-appropriate forms of assessment.

T&L 513. Linguistics for ELL Teachers. 3 Credits.
This course explores language education models, programs and policies with an emphasis on English language learners (ELLs). Political, legal, historical, and cultural contexts of multilingual education will be discussed with a focus on both U.S. and global challenges.

T&L 515. Middle School Curriculum. 3 Credits.
This course examines the middle school curriculum and instructional strategies as well as the needs of early adolescents. The course focuses on the roles teachers play in incorporating a guided, interdisciplinary, collaborative team approach. The studies include the components of curriculum teaming, advisory, exploration, learning communities and instruction (differentiation, cooperative learning, learning styles, instructional strategies) incorporated in middle schools.

T&L 516. Philosophy and Foundations of Middle School Education. 3 Credits.
This course examines the historical and philosophical background of middle level education. The focus is on the roles teachers/administrators play in incorporating this guided, interdisciplinary, collaborative team approach that assists students during these fundamentally transformative years. The course looks at the philosophical aspect of the curriculum and instructional component. The studies explore contemporary issues associated with the middle school as well as the adaptations necessary for special circumstances affiliated with middle schools.
T&L 517. Social Emotional Learning & Guidance. 3 Credits.
This course is designed to offer strategies for caregivers to support young children's positive social and emotional development, behavior, and learning through the exploration of how early experiences shape development. The emotional and social development of children, including the causes, expressions, prevention, and management of challenging behaviors in all children birth to age eight are examined. Emphasis is placed on caregiver/family/child relationships, positive emotional/social environments, developmental implications, adverse childhood risk factors, and intervention strategies. Students will identify factors influencing emotional/social development, utilize screening measures, and design positive behavioral supports. SS.

T&L 518. Science in the Elementary School. 3 Credits.
A study of current trends and practices associated with teaching and assessing inquiry-based science in elementary classrooms.

T&L 519. Social Studies in the Elementary School. 3 Credits.
A study of current trends and practices associated with teaching and assessing social studies in elementary classrooms.

T&L 520. Curriculum and Instruction in the Elementary School. 4 Credits.
A study of processes for planning, implementing, and evaluating curriculum and improving instruction in elementary schools.

T&L 521. Differentiated Instruction. 3 Credits.
An introduction to the principles of differentiated instruction. Topics of study include: brain-based learning, responsive instructional and assessment strategies, linking curriculum standards to learner needs, organizing and managing a differentiated classroom, and relevant resources for implementation.

T&L 522. Mathematics in the Elementary School. 3 Credits.
A study of current trends and practices associated with teaching and assessing inquiry-based math in elementary classrooms.

T&L 523. Literacy Instruction for English Language Learners. 3 Credits.
This course addresses the foundations of teaching English language and literacy to English Language Learners (ELLs). Topics will include practices for reading and writing instruction, vocabulary development, assessment of other programmatic settings, students will explore how assessment of play indicates a child's development, and they will use assessment to promote Developmentally Appropriate Practices (DAP) for PreK-Grade 3 (ages 3-8) learners.

T&L 524. Reading in the Content Areas. 2 Credits.
How and why reading should be taught in the content areas (i.e. Social Studies, Science, Mathematics, etc.). Research studies in the field of content reading and a variety of instructional practices are reviewed.

T&L 525. Writing in the Classroom. 3 Credits.
This course examines writing as a process that is developmental, cultural, social, and individual. Emphasis is on effective implementation of the essential structures of writing workshop and on monitoring and assessing writers' growth.

T&L 526. Play in Development and Early Childhood Education. 3 Credits.
This course explores the role of play in cognitive, physical and social-emotional development, and the way in which play is incorporated into educational and other programmatic settings. Students will explore how assessment of play indicates a child's development, and they will use assessment to promote Developmentally Appropriate Practices (DAP) for PreK-Grade 3 (ages 3-8) learners.

T&L 527. Curricular Foundations in Early Childhood Education. 3 Credits.
This course examines the historical, philosophical, cultural, race, class, and gender influences on curriculum in early childhood, including the philosophy and mission of the Department of Teaching and Learning.

T&L 528. Children's and Young Adult Literature in the Classroom. 3 Credits.
This course explores the major area of literature for children and young adults in response to two questions: What is the range of literature available for children and young adults today? In what ways might children's and young adult literature be used in the classroom to promote literacy growth? SS.

T&L 529. Language Development & Cognition in Children. 3 Credits.
This course provides foundational information about language and cognitive development in children. The course content will also analyze typical and atypical language and cognitive development. The focus of the course will include children birth to age eight.

T&L 530. Foundations of Reading Instruction. 3-4 Credits.
This course focuses on the relationship between reading theory, research, contemporary issues and instructional practice. Emphasis is placed on strategic systems related to effective reading, instructional approaches that support the development of these strategic systems and assessment as collecting evidence of effective reading behaviors.

T&L 531. Early Literacy Development and Instruction. 3 Credits.
A study of early literacy processes including phonemic and print awareness, word recognition, comprehension, and writing. Emphasis is on reviewing current research and theory, assessment and instruction practices, and bridging language and literacy development in literacy rich environments.

T&L 532. Leadership in Literacy. 3 Credits.
The role of the literacy coach is to support teachers in closing the gap between learners' performance and achievement in reading and writing. Topics in this course will include providing leadership for a school's literacy program, collaboration with teachers and administrators, curriculum issues, knowledge of literacy standards, and professional development facilitation. On demand.

T&L 533. Secondary English Language Arts & Literacy Instruction. 3 Credits.
This graduate level course explores teaching literacy in the English Language Arts middle and high school classroom. Students will explore how the traditional and contemporary approaches to teaching literature, nonfiction, and digital media work to support the advanced literacy goals of reading, writing, listening and speaking for adolescents. Students will explore Language Arts instructional methods and develop curriculum in the areas of literature, writer's workshop, academic inquiry, language vocabulary, and digital literacy. Students will also explore the ways the literacy program is supported and assessed throughout the entire secondary school. SS.

T&L 534. Basic Reading Diagnosis and Remediation. 2 Credits.
Focuses on common causes of reading disability, methods of diagnosis, and corrective reading programs in the classroom. Corequisite: T&L 583.

T&L 535. Advanced Reading/Language Arts Diagnosis and Remediation. 2 Credits.
Analysis of interrelationships of learning difficulties in language arts areas and procedures for remediation. Prerequisites: T&L 530 and T&L 534.

T&L 536. Innovations in English Language Arts Instruction. 3 Credits.
This course considers the current curricular trends and research-based best practices in teaching English Language Arts. Students will critically examine and apply current instructional approaches in teaching English language and vocabulary, classroom discourse practices, and digital literacies. We will consider the ways various instructional methods support the advancement of literacy development for all students, considering ways to modify and adapt curriculum to meet the cultural and linguistic diversity of today's classrooms. On demand.

T&L 537. ELL Methods and Materials. 3 Credits.
This course explores current methods and materials in ELL education, with a focus on teaching academic language and sheltered content instruction. F,S,SS.

T&L 538. Supervision of Student Teaching. 2 Credits.
For supervisors and directors of student teaching in colleges and cooperating schools. Principles and practices on how to provide the most beneficial experiences for student teachers.

T&L 539. College Teaching. 3 Credits.
Explores learning styles and teaching styles, the components and responsibilities involved in college teaching, methods of teaching and motivating students, and current issues related to instruction in the college classroom.

T&L 540. Theory and Philosophies of Curriculum in Schools. 3 Credits.
This course explores the historical development of the K-12 curriculum, the philosophical and theoretical aspects applied to curriculum, and the social conditions that impact curriculum.

T&L 541. History of Higher Education in the United States. 3 Credits.
Study of major events and people shaping higher education in the U.S. Role, philosophy, and organization of institutions of higher education discussed.

T&L 542. Models of Teaching. 3 Credits.
This course focuses on various models of teaching; social interaction, information-processing, inquiry and behavioral. The purpose of the course is to provide teachers with a variety of instructional models related to meaningful learning experiences for students.
T&L 543. Scholarly Writing. 3 Credits.
Designed to assist students with learning the art of scholarly writing, this course will aid students in designing, formatting, and completing research-based and other scholarly writing projects, as well as understanding the rules and norms of academic publishing.

T&L 544. Assessment in Higher Education. 3 Credits.
A wide range of assessment issues in higher education will be explored. This includes course, program, and institutional assessment as well as classroom assessment techniques. Students will examine and understand the assessment process.

T&L 545. Adult Learners. 3 Credits.
This course will cover theories of adult development, current research on adult learners, ways of assessing the needs and interests of adult learners, and ways of creating environments in which adult learners can thrive.

T&L 546. College Students with Special Needs. 3 Credits.
This course explores the range of special needs college students bring to campus and how faculty, staff, and administrators might appropriately meet those needs. Prerequisite: Admission to the School of Graduate Studies or instructor permission. S.

T&L 547. Technology in Higher Education. 3 Credits.
Students will examine the various uses and integration of technology and media in higher education by faculty in their attempt to engage learners with each other, the course content, and with instructors.

T&L 548. The Professoriate. 3 Credits.
This course is a study of the development of the American professoriate by way of historical, scholarly, popular, and contemporary perspectives. It also examines the transition of new faculty members to their initial academic appointment.

T&L 549. Seminar. 1-4 Credits.
The seminar will focus on a specific topic relating to teaching and learning. The specific content will vary depending upon student needs and faculty resources. Repeatable. S/U grading.

T&L 550. Assessment and Evaluation in ELL Education. 3 Credits.
This course combines readings and theoretical discussion of assessment with hands-on experience in assessing ELLs. Students will learn how to use a variety of formal and informal assessments with a focus on how to use assessment data in planning instruction. Topics will include classroom-based assessments, language proficiency testing, testing accommodations for ELLs, and assessment of ELLs for special education and gifted education, and ELL program evaluation.

T&L 551. Second Language Acquisition for ELL Teachers. 3 Credits.
This course will explore the socio- and psycho-linguistic aspects of interlanguage by studying the theories and research of first and second language acquisition. Students will examine the nature of learners and their individual differences during the stages of language development, with a focus on children and K-12 classrooms.

T&L 553. Collaborative Relationships: Home, School and Community. 3 Credits.
A course appropriate for anyone working with families, early childhood educators, general educators, special educators, related service personnel, administrators and outside agency personnel. Topics covered include: (1) the various models of collaboration and consultation and the stages of each; (2) communication skills; (3) problem-solving; (4) conflict management; (5) diverse perspectives; (6) information collection procedures; (7) supervisory skills; (8) family characteristics and structure across the lifespan; (9) family focused intervention; (10) school choices; and (11) school issues such as poverty, domestic violence, teasing, bullying, and school violence.

T&L 558. Middle School Science and Engineering Lab1:Solids. 2 Credits.
T&L 559A. MS Sci.Eng-2: Solids. 3 Credits.
Prerequisites: T&L 558, admission to Graduate School, ND Teacher licensure and Admission to program "Improving Math and Science Literacy of Middle and High School Students of North Dakota Through Teacher-Faculty Partnerships".

T&L 559B. MS Sci.Eng-2: Solids. 3 Credits.
Prerequisites: T&L 558, admission to Graduate School, ND Teacher licensure and Admission to program "Improving Math and Science Literacy of Middle and High School Students of North Dakota Through Teacher-Faculty Partnerships".

T&L 566. Brain in Memory and Learning. 3 Credits.
Prerequisite: Admissions to Grad School.

T&L 567. Language Structure and Analysis for ELL Teachers. 3 Credits.
This course explores the grammatical and discourse structures of the modern English language, analysis of grammar and discourse with a focus on specific problem areas for ELLs, and pedagogical implications for English language development.

T&L 568. Research and Advocacy in TESOL. 3 Credits.
This course prepares teachers to both understand and conduct research in TESOL. Emphasis will be placed on using research data to advocate for changes and improvement in ELL education.

T&L 569. Action Research. 3 Credits.
The study of the philosophy and methods of action research. Emphasis is focused on analysis of and reflection on one's teaching for the purpose of improvements in student learning. Prerequisite: Graduate status. S.

T&L 571. Teacher Education. 3 Credits.
Practices, issues, and trends in the design and implementation and assessment of programs for the preparation and development of K-12 teachers.

T&L 572. Teacher Education: Focus on the Learner. 3 Credits.
The study of teacher education in relation to the lives of P-12 students. This course includes the examination of children and their lives through aspects of race, religion, socioeconomics, linguistics and age, and considers educational implications for preservice and inservice teachers.

T&L 573. Middle School Science and Engineering Lab2: Liquids. 2 Credits.
T&L 574. MS Sci.Eng-4: Liquid/Gas. 3 Credits.
Prerequisites: T&L 573, admission to Graduate School, ND Teacher licensure and Admission to program "Improving Math and Science Literacy of Middle and High School Students of North Dakota Through Teacher-Faculty Partnerships".

T&L 575. Middle School Science and Engineering Lab3: Mot/Elec. 2 Credits.

T&L 576A. MS Sci.Eng.-6:Motion/Electric. 3 Credits.
Prerequisites: T&L 575, admission to Graduate School, ND Teacher Licensure and employment as a teacher in a ND school.

T&L 576B. MS Sci.Eng.-6:Motion/Electric. 3 Credits.
Prerequisite: T&L 576A.

T&L 577. Assessment of Learning. 3 Credits.
This course addresses the theory and practice of assessment, specifically the process of gathering and discussing information from multiple and diverse sources in order to develop a deep understanding of what students know, understand, and can do with their knowledge as a result of educational experiences.

T&L 579. Classroom Based Inquiry. 3 Credits.
Concepts learned in T&L 569 will be looked at in-depth and theoretical constructs such as Living Theory, Self Study, and Critical Theory constructs will be studied. Students plan and conduct an in-depth inquiry project within a school setting, complete the associated IRB, and create and academic poster and/or prepare a proposal of the Inquiry project for a professional setting. Prerequisites: TL graduate status and T&L 569; or by permission of instructor. F.S.

T&L 580. Practicum in Schools. 1-4 Credits.
Practicum in study of desirable school practices, observations in nearby schools, and application of research findings in solving practical problems. Prerequisites: Appropriate foundational and major area courses, and consent of the instructor and advisor. Repeatable.

T&L 581. Resident Internship. 4 Credits.
A full-time, year-long internship experience conducted in a cooperating school district. Interns are assigned as members of instructional teams with full responsibility for a portion of the cooperating school's instructional program. Prerequisites: Participation in the summer program prior to the internship and teaching licensure (see dept for approval).

T&L 582. Resident Internship. 4 Credits.
A full-time, year-long internship experience conducted in a cooperating school district. Interns are assigned as members of instructional teams with full responsibility for a portion of the cooperating school's instructional program. Prerequisites: Participation in the summer program prior to the internship and teaching licensure (see dept for approval).

T&L 583. Reading Clinic. 2 Credits.
T&L 584. Internship in Education. 1-8 Credits.
This is a culminating experience primarily for Sixth year and Doctoral students. The internships will be identified in one of the following sub-areas: (A) Educational Administration, (B) Special Education, (C) Curriculum, (D) Educational Research, or (E) Teacher Education. Prerequisites: Appropriate foundational, cognate, and major area coursework and consent of advisor and instructor. Repeatable.

T&L 589. Professional Development: Resident Teacher Program. 2 Credits.
This field-based experience provides mentoring and coaching, translates baccalaureate theory and research into practice, and requires active participation in the school placement and classroom setting. Issues and topics relevant to first year teachers and graduate education are emphasized through field work and discussions. Prerequisite: Admission into the Elementary Education Resident Teacher Program. SS.

T&L 590. Special Topics. 1-4 Credits.
Exploration of special topics in the study of education not regularly included in available course offerings. May be repeated for different topics. Prerequisite: Consent of instructor or advisor. Repeatable.

T&L 591. Readings in Education. 1-4 Credits.
Designed primarily for advanced graduate students. May be repeated for different topics. Prerequisite: Consent of instructor and advisor. Repeatable.

T&L 593. Independent Projects. 1-4 Credits.
Repeatable.

T&L 596. Individual Research in Education. 1-4 Credits.
Prerequisite: Consent of instructor and advisor. Repeatable.

T&L 995. Scholarly Project. 2 Credits.
The scholarly project demonstrates critical analysis and application of information and experiences gained throughout the program of study. The project allows students to demonstrate scholarly skills in an integrated manner that is directly related to their roles as teachers, program evaluators, and action researchers. The scholarly project must be approved by the student's adviser.

T&L 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

T&L 997. Independent Study. 2 Credits.

T&L 998. Thesis. 1-9 Credits.
Repeatable to 9 credits.

T&L 999. Dissertation. 2-15 Credits.
Repeatable to 15 credits.

Undergraduate Courses for Graduate Credit

T&L 322. Administration and Leadership in Early Childhood Education. 3 Credits.
An investigation of patterns of administration, curriculum organization, spatial resources, and staffing in early childhood settings, serving children 0-8 years old. Topics include federal and state laws and emerging trends in preschool and primary education in the state, region, and nation. Sixteen (16) hours of field experience. Prerequisite: Admission to the Teacher Education program. S.

T&L 422. Development of the Gifted and Talented. 2 Credits.
Research and theory for understanding the development needs of the more able child in early childhood and in educational experiences. S.

T&L 423. Assessment and Individualized Planning in Special Education. 3 Credits.
A study of the principles and practices of: (1) obtaining diagnostic information on school-related problems of a student; (2) assimilating this information and prescribing appropriate alterations based on continuous measurement data. Prerequisites or Corequisites: TL 315 and T&L 319. F.S.

T&L 493. Workshop. 1-4 Credits.
Special problems in Special Education; consideration of special problems of concern to the Special Education teacher and other educators. Repeatable to 8 credits. F.S.

Master of Education in ELL Education

Admission Requirements
The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. An undergraduate degree in education, or a related field.
2. A cumulative Grade Point Average (GPA) of at least 2.75 for all undergraduate work or a GPA of at least 3.0 for the junior and senior years of undergraduate work (based on a A = 4.00).
3. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.
4. Students currently enrolled in UND’s Graduate Certificate in ELL Program who want to transfer to the M.Ed. in ELL Education program must apply for admission to the M.Ed. program. Students who have completed the Graduate Certificate have two years from the date of certificate completion to be apply and be accepted into the M.Ed. program and have their certificate courses credited towards the M.Ed. degree.

Master of Education (M.Ed.)

This degree is the highest academic credential normally held by teachers in the TESOL field. While the program focuses on K-12 education in the United States, the program is also responsive to those planning to teach adult ESL or teach English overseas. The program may be completed in six semesters. A 90-hour field experience is required in addition to a final scholarly project or independent study.

Degree Requirements

1. Thirty-five (35) credits including a minimum of twelve in the major, six in a cognate area, and six in foundations.
2. A minimum of two credits of Independent Study or Scholarly Project.
3. At least one-half of the credits must be at or above the 500-level.
4. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.
5. Preparation of a written independent study or scholarly project approved by the faculty advisor.
6. Required Courses:
7. Major

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<tr>
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<tbody>
<tr>
<td>T&amp;L 523</td>
<td>Literacy Instruction for English Language Learners</td>
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<tr>
<td>T&amp;L 514</td>
<td>Introduction to Multilingual Education</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 537</td>
<td>ELL Methods and Materials</td>
<td>3</td>
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<td>T&amp;L 550</td>
<td>Assessment and Evaluation in ELL Education</td>
<td>3</td>
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<td>T&amp;L 568</td>
<td>Research and Advocacy in TESOL</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 580</td>
<td>Practicum in Schools</td>
<td>3</td>
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<td>Scholarly Project</td>
<td>2</td>
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<td>or T&amp;L 997</td>
<td>Independent Study</td>
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Cognate

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<td>T&amp;L 513</td>
<td>Linguistics for ELL Teachers</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 567</td>
<td>Language Structure and Analysis for ELL Teachers</td>
<td>3</td>
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<tr>
<td>T&amp;L 551</td>
<td>Second Language Acquisition for ELL Teachers</td>
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Foundations

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<td>EFR 500</td>
<td>Introduction to the Foundations of Education</td>
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<td>EFR 506</td>
<td>Multicultural Education</td>
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</table>

Total Credits 35

Higher Education

M.S. in Higher Education (p. 415)
Ed.D. in Higher Education (p. 414)
Ph.D. in Higher Education (p. 414)
Courses

HE 501. Introduction to Higher Education. 3 Credits.
An overview of administration of America’s colleges and universities. Topics include roles of state and federal government, governing boards, institutional organization and culture, types of institutions, faculty, students, research about higher education, and the profession of administrator. On demand.

HE 503. Diversity Across Higher Education. 3 Credits.
The course intends to promote understanding of the diverse populations within higher education and to encourage students to examine their own attitudes regarding diversity and openness to other cultures. Examination of practice models for service delivery to diverse populations will help prepare students to develop management, leadership, and advocacy skills. The course will underscore the development of skills for working with individuals, small groups, and campus groups in relation to equity, diversity, and inclusion. On demand.

HE 505. The College Student. 3 Credits.
This course will examine the theoretical perspectives that describe students’ growth throughout the late adolescent and adult life span. The course will look at theory in the areas of intellectual, moral, ego, psychosocial, career, and spiritual development. Further, the course will examine sources of identity including gender, race, culture, ethnicity, and sexual identity. On demand.

HE 507. Collegiate Environments. 3 Credits.
The course will discuss how student characteristics influence student educational and development needs, and the effects of the college experience on student learning and development. This course also will examine collegiate environments and how students’ person-environment interactions affect their development. On demand.

HE 509. Higher Education Management. 3 Credits.
This course will examine the administrative functions of higher education including student affairs, academic affairs, institutional advancement, and administrative services. Students will be introduced to professional issues, ethics, standards of practice, and the legal environment. On demand.

HE 511. Program Development. 3 Credits.
This course will examine the learning theories that undergird the design and delivery of educational programs and services. Students will acquire the knowledge and skills needed to conduct needs assessments and outcomes assessments in-person and mediated environments. They will also learn and demonstrate program planning, development and implementation process. On demand.

HE 513. College Students and the Law. 3 Credits.
This course provides an overview of key legal issues that pertain to college students. Using a legal frame and analysis, the focus of the course surrounds administrative decision making, effective practices, and organizational policy design and implementation. On demand.

HE 529. Capstone Seminar. 1 Credit.

HE 532. Principles and Practices in Higher Education. 3 Credits.
This course is designed for students newly admitted to the doctoral program in higher education. It introduces the students to the study of higher education enterprise in terms of its context, research, and practice. Among the topics covered, students in the course will explore the significance of institutional missions and purposes, federal and state governments, and the academic community. On demand.

HE 536. Leading and Learning in Higher Education. 3 Credits.
Colleges and universities are complex organizations with a core purpose of learning. An understanding of organizations, what they are and how they function is critical to success as a higher education professional. Further each member of the organization is called on to provide leadership for the organization in the classroom, the department, and other organizational units. Effective leaders will understand the organization and how their roles and work help support the institution’s effectiveness in educating students. On demand.

HE 538. College Student Experiences. 3 Credits.
Given the growing awareness, economically, politically, and socially, of the need for students to succeed in college, faculty, staff, and administrators are increasingly being held accountable for college persistence and completion. A significant factor in students’ success is their learning and development. Students in this course will explore concepts and theories related to student learning and development and be challenged to interpret and apply theories to real-world higher education practice, considering how these processes influence student success. On demand.

HE 549. Dissertation Orientation. 3 Credits.
This course introduces students to the dissertation process, focusing specifically on proposal formulation. S/U grading. On demand.

HE 561. Curriculum in Higher Education. 3 Credits.
A study of processes for planning, implementing, and evaluating curriculum within institutions of higher education. Topics will include historical perspectives on curriculum in higher education, governance systems related to curriculum development and adoption, and issues of current interest and concern. On demand.

HE 563. Academic Administration in Higher Education. 3 Credits.
The roles and responsibilities of academic administration in higher education. Topics include the major academic roles (chairperson, dean, chief academic officer), curriculum and instruction, program evaluation, assessment, planning, faculty workload and evaluation, and the profession of administrator. On demand.

HE 564. Higher Education Student and Support Services. 3 Credits.
An overview of the organization and functions of student and support services within institutions of higher education. Students will gain an understanding of the administrative issues related to career services, student counseling, enrollment services, student activities, health services, student organization, and other institutional units, which serve the needs of students at a college or university. On demand.

HE 569. Higher Education Diversity Systems and Policy. 3 Credits.
The course is designed to provide students with a critical understanding of issues of diversity in higher education from an institutional and systematic perspective. Multiple levels and dimensions of diversity will be discussed, including structural, institutional and systematic manifestations of how diversity and equity are historically and currently addressed. Institutional type and role will also be explored. On demand.

HE 570. Higher Education Law. 3 Credits.
An overview of the legal issues that confront college and university personnel. Pertinent federal and state statutes as well as case law will be used to instruct about legal rights and responsibilities of university/college administrators and students. The legal relationships between the institution and the faculty, the student, state government, and the federal government will be explored. On demand.

HE 573. Higher Education and Public Policy. 3 Credits.
The course addresses the development, analysis, and implementation of public policy in postsecondary education and the structures and actors involved in policy activity. The course will also introduce students to current and ongoing postsecondary public policy issues at the state, national, and international levels. On demand.

HE 576. Higher Education Planning and Finance. 3 Credits.
Higher education must plan to ensure the future of the institution and those plans guide the allocation of resources to accomplish the institutional mission and plan. This course will provide an overview of planning processes and the subsequent allocation of resources to implement the plan. Students will also learn about financial management including budgeting, financial policies and performance metrics. The college administrator’s role in guiding the fiscal welfare of an institution of higher education will be explored. On demand.

HE 579. Special Topics in Higher Education. 1-3 Credits.
Exploration of special topics in the study of education not regularly included in available course offerings. May be repeated for different topics. Prerequisite: Consent of instructor or advisor. Repeatable.

HE 591. Practicum in Higher Education. 1-4 Credits.
Students will complete projects to further student learning through course design, teaching, and assessment. Repeatable up to a maximum of 8 credits. Prerequisite: Consent of advisor and instructor. Repeatable to 8 credits. On demand.

HE 592. Internship in Higher Education. 1-8 Credits.
This is a professional practice experience in an administrative unit. May be repeated to a maximum of 8 credits. Prerequisites: Consent of advisor and instructor. Repeatable to 8 credits. On demand.

HE 594. Readings in Higher Education. 1-4 Credits.
Designed primarily for advanced graduate students. May be repeated for different topics to a maximum of 9 credits. Prerequisites: Consent of advisor and instructor. Repeatable to 9 credits. On demand.
HE 595. Higher Education Seminar. 1-9 Credits.
A seminar for advanced graduate students on a focused topic. Students will have significant responsibility for preparing and presenting papers and studies on the focus topic. May be repeated to a maximum of 9 credits. Prerequisites: Consent of the instructor and advisor. Repeatable to 9 credits. S/U grading. On demand.

HE 597. Administrative Project in Higher Education. 1-4 Credits.
For advanced graduate students. Students will undertake an assignment from an administrator for a project that will be implemented once it is completed. Repeatable to a maximum of 4 credits. Prerequisites: Consent of advisor and instructor. Repeatable to 4 credits. On demand.

HE 598. Individual Research in Higher Education. 1-9 Credits.
Students design a research study, implement the research plan, and/or publish the results of the project. May be repeated to a maximum of 9 credits. Prerequisites: Consent of advisor and instructor. Repeatable to 9 credits.

HE 995. Scholarly Project. 2 Credits.
Prerequisite: Consent of advisor. On demand.

HE 996. Continuing Enrollment. 1-12 Credits.
Repeatable to a maximum of 48 credits. Prerequisite: Consent of the advisor. Repeatable. S/U grading.

HE 997. Independent Study. 2 Credits.
Prerequisite: Consent of the advisor.

HE 998. Thesis. 1-9 Credits.
Prerequisite: Consent of the advisor. Repeatable to 9 credits.

HE 999. Dissertation. 1-12 Credits.
Students work on the dissertation/dotal capstone project. Prerequisite: Consent of the advisor. Repeatable to 12 credits. F,S,SS.

Doctor of Education in Higher Education

Admission Requirements

The following criteria will be used to assess a student’s application for admission into the doctoral programs in the Department of Educational Leadership. No single criterion can adequately predict a student’s probable success in graduate work; as such, candidates for admission to the doctoral programs are evaluated on the following criteria:

1. A bachelor’s degree from an accredited college or university.
2. Completion of a master’s degree from an accredited college or university
3. Grade point average from all previous graduate work (minimum of 3.5 required)
4. Professional resume
5. Educational leadership essay
6. Statement of professional goals
7. Writing sample
8. Three (3) letters of recommendation
9. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as listed in the Graduate Academic Information section.
10. Students who have received a bachelor’s degree or higher from the United States or English-speaking Canada are not required to submit the TOEFL.

Degree Requirements

Students seeking the Doctor of Education degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Educational Leadership Department.

The Ed.D. program in Higher Education is designed primarily for practitioners preparing for college and university administration positions.

1. A minimum of 96 semester credit hours of course work beyond the bachelor’s degree.
2. Maintenance of at least a 3.0 GPA for all classes completed as a graduate student.
3. Completion of a dissertation, which incorporates independent work that is an original contribution to knowledge.
4. With approval of a student’s Faculty Advisory Committee, up to 30 credits from a master’s degree may be transferred from another institution.
5. Successful completion of comprehensive examinations in Educational Leadership and Educational Foundations and Research.
6. Successful completion of a final examination.

Required Courses:

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<tr>
<th>Minor/Master's transfer credits (30 credits)</th>
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<tbody>
<tr>
<td>Higher Education Common Core (18 credits):</td>
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<tr>
<td>HE 532 Principles and Practices in Higher Education</td>
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<tr>
<td>HE 536 Leading and Learning in Higher Education</td>
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</tr>
<tr>
<td>HE 538 College Student Experiences</td>
<td>3</td>
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<td>HE 549 Dissertation Orientation</td>
<td>2</td>
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<td>T&amp;L 541 History of Higher Education in the United States</td>
<td>3</td>
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<td>T&amp;L 543 Scholarly Writing</td>
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<tr>
<td>Educational Foundations (12 credits):</td>
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<tr>
<td>Advanced Foundations elective 1</td>
<td>3</td>
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<tr>
<td>Advanced Foundations elective 2</td>
<td>3</td>
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<tr>
<td>Advanced Foundations elective 3</td>
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<td>Advanced Foundations elective 4</td>
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<td>Scholarly Tools (6 credits):</td>
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<tr>
<td>EFR 510 Qualitative Research Methods</td>
<td>3</td>
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<tr>
<td>EFR 516 Statistics II</td>
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<tr>
<td>Administration Emphasis (20 credits):</td>
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<tr>
<td>Core (9 credits):</td>
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<tr>
<td>HE 563 Academic Administration in Higher Education</td>
<td>3</td>
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<tr>
<td>HE 570 Higher Education Law</td>
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<td>HE 576 Higher Education Planning and Finance</td>
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<td>Electives (11 credits):</td>
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<td>Selected with consent of advisor</td>
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<td>OR</td>
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<tr>
<td>Individualized Emphasis (20 credits):</td>
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</tr>
<tr>
<td>Electives selected with consent of advisor and faculty from area of specialization</td>
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<tr>
<td>Dissertation</td>
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<tr>
<td>Total Credits</td>
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</table>

Doctor of Philosophy in Higher Education

Admission Requirements

The following criteria will be used to assess a student’s application for admission into the doctoral programs in the Department of Educational Leadership. No single criterion can adequately predict a student’s probable success in graduate work; as such, candidates for admission to the doctoral programs are evaluated on the following criteria:
1. Completion of a master’s degree from an accredited college or university
2. Grade point average from all previous graduate work (minimum of 3.5 required)
3. Professional resume
4. Educational leadership essay
5. Statement of professional goals
6. Writing sample
7. Three (3) letters of recommendation
8. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.
9. Students who have received a bachelor’s degree or higher from the United States or English-speaking Canada are not required to submit the TOEFL.

Degree Requirements

Students seeking the Doctor of Philosophy degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Educational Leadership Department.

The Ph.D. program in Higher Education is designed for students preparing for positions in which research and creative experience are predominant interests. Ph.D. candidates are expected to have undertaken and completed independent research leading to an original contribution of knowledge in the field. It is generally expected that the Ph.D. dissertation will be publishable. This degree option typically provides preparation for those who aspire to leadership positions in higher education, in government agencies, or in other educational policy organizations.

1. A minimum of 90 semester credit hours of course work beyond the bachelor’s degree.
2. Maintenance of at least a 3.0 GPA for all classes completed as a graduate student.
3. Completion of a dissertation, which incorporates independent work that is an original contribution to knowledge.
4. With approval of a student’s Faculty Advisory Committee, up to 30 credits from a master’s degree may be transferred from another institution.
5. Successful completion of comprehensive examinations in Educational Leadership and Educational Foundations and Research.
6. Successful completion of a final examination.

Minor/Master’s transfer credits (24 credits) 24

Higher Education Common Core (18 credits):

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<td>Principles and Practices in Higher Education</td>
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<tr>
<td>HE 536</td>
<td>3</td>
<td>Leading and Learning in Higher Education</td>
</tr>
<tr>
<td>HE 538</td>
<td>3</td>
<td>College Student Experiences</td>
</tr>
<tr>
<td>HE 549</td>
<td>2</td>
<td>Dissertation Orientation</td>
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<td>T&amp;L 541</td>
<td>3</td>
<td>History of Higher Education in the United States</td>
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<td>T&amp;L 543</td>
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Scholarly Tools (12 credits):

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<tr>
<td>EFR 510</td>
<td>3</td>
<td>Qualitative Research Methods</td>
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<td>EFR 516</td>
<td>3</td>
<td>Statistics II</td>
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<td>Advanced Scholarly Tool elective 1</td>
<td>3</td>
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Administration emphasis (18 credits):

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<td>Academic Administration in Higher Education</td>
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<td>HE 570</td>
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<td>Higher Education Law</td>
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Individualized emphasis (18 credits):

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<td>Electives selected with consent of advisor and faculty from area of specialization</td>
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<tr>
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Master of Science in Higher Education

Admission Requirements

1. A bachelor’s degree from an accredited college or university.
2. A cumulative undergraduate GPA of 2.75 or at least 3.00 for the last two years. Typically, applicants with teaching experience in schools apply to the M.Ed. program, not the M.S. program.
3. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the Graduate Catalog.
4. Students who have received a bachelor’s degree or higher from the United States or English-speaking Canada are not required to submit the TOEFL.
5. All applicants are required to respond to essay questions provided in the application, submit a resume and writing sample.

Degree Requirements

1. A bachelor’s degree from an accredited college or university.
2. A cumulative undergraduate GPA of 2.75 or at least 3.00 for the last two years. Typically, applicants with teaching experience in schools apply to the M.Ed. program, not the M.S. program.
3. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the Graduate Catalog.
4. Students who have received a bachelor’s degree or higher from the United States or English-speaking Canada are not required to submit the TOEFL.
5. All applicants are required to respond to essay questions provided in the application, submit a resume and writing sample.

Required Courses:

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<tr>
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<tr>
<td>HE 501</td>
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<td>Introduction to Higher Education</td>
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<tr>
<td>HE 503</td>
<td>3</td>
<td>Diversity Across Higher Education</td>
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<tr>
<td>HE 505</td>
<td>3</td>
<td>The College Student</td>
</tr>
<tr>
<td>Educational Foundations &amp; Research:</td>
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<tr>
<td>EFR 500</td>
<td>3</td>
<td>Introduction to the Foundations of Education</td>
</tr>
<tr>
<td>EFR 509</td>
<td>3</td>
<td>Introduction to Applied Educational Research</td>
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<td>T&amp;L 541</td>
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<td>History of Higher Education in the United States</td>
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<td>Integrative Learning Experiences:</td>
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<td>HE 529</td>
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<td>Capstone Seminar</td>
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<tr>
<td>HE 997</td>
<td>2</td>
<td>Independent Study</td>
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<td>Electives (Sampling of Potential Electives):</td>
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<tr>
<td>HE 507</td>
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<td>Collegiate Environments</td>
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<td>Higher Education Management</td>
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Instructional Design and Technology

M.S. in Instructional Design & Technology (p. 418)
M.Ed. in Instructional Design & Technology (p. 417)

IDT Graduate Certificate in K-12 Technology Integration (http://und-public.courseleaf.com/graduateacademicinformation/departmentalcoursesprograms/education/idt-cert-ctp)
IDT Graduate Certificate in Corporate Training and Performance (http://und-public.courseleaf.com/graduateacademicinformation/departmentalcoursesprograms/education/idt-cert-te)
IDT Graduate Certificate in eLearning (http://und-public.courseleaf.com/graduateacademicinformation/departmentalcoursesprograms/education/idt-cert-el)
Cognate/Minor in Instructional Design and Technology (http://und-public.courseleaf.com/graduateacademicinformation/departmentalcoursesprograms/education/instructionaldesigntechnology/idt-minor)

Courses

IDT 500. Survey of Instructional Design. 3 Credits.
This course provides students with an in-depth overview of the field of Instructional Technology. Topics include the history and critical issues of the field; a description of instructional design; applications of instructional technology, and associated areas of research.

IDT 510. Technology-Based Instruction: Applications and Methods. 3 Credits.
A study of the various methods for using technology to deliver and/or support instruction: tutorials, drills, simulation, interactive video, instructional games, intelligent computer-based instruction, performance support systems, job aids, testing, distance learning, intelligent tutoring systems, and instructional management systems.

IDT 520. Instructional Systems Analysis and Design. 3 Credits.
The first course in a two-course required sequence. IDT 520 is a study of methodologies for analyzing and designing instruction. Topics include needs analysis, job/task analysis, and assessment of instructional outcomes. IDT 525 is the second required course in this two-course sequence.

IDT 525. Development, Implementation, and Evaluation of Instructional Materials. 3 Credits.
This course focuses on the development, implementation, and evaluation of instructional materials that have been created according to instructional design principles. The second course in a two-course sequence, this course completes the instructional design process begun in IDT 520. After completing this two-course sequence, students will have the skills needed to conduct the full instructional design process in a variety of settings, and with a variety of learners, audiences, and domains. Prerequisites: Program major or permission of instructor; IDT 520.

IDT 530. Introduction to Computer-Based Instruction. 3 Credits.
An examination of the technology (hardware and software) for developing and delivering computer-based instruction (CBI). A study of the characteristics of high-quality CBI, addressing such topics as program structure, user interface, navigation, message/screen design, use of graphics, response analysis, feedback strategies, error checking, branching, and computer-managed instruction. Prerequisite: IDT 520.

IDT 535. Advanced Computer-Based Instructional Development. 3 Credits.
This course is designed to extend the CBT/CBI design and development skills acquired in IDT 530. Students will study advanced CBT/CBI techniques and applications such as artificial intelligence, intelligent tutoring systems, electronic performance support systems, authoring tools, learning objects, pedagogical agents, SCORM compliant programming, simulations and games, the use of CBT/CBI for research purposes, and learning management systems (LMS). In addition to studying these areas, students will build a CBT/CBI unit that implements one or more of these applications. Prerequisites: Program Major; IDT 530.

IDT 540. Digital Media and the Internet in Schools. 3 Credits.
This course builds on the theories and approaches to technology integration first introduced in IDT 510. Students will gain practice developing lesson plans and examples of student artifacts with specific media such as digital video, digital audio, digital photography, and the Internet. Students will gain competency in generating and using media according to the principles of technology integration, rather than technology use. Prerequisites: IDT 510 and IDT 520.

IDT 545. Instructional Simulations and Games. 3 Credits.
This course provides an in-depth study of the theoretical, philosophical, and practical issues surrounding the use of simulations and games in learning environments. Methods and approaches for integrating commercial games into learning environments and for developing new simulations and games around content will be examined. Prerequisite: Program major or permission of instructor.

IDT 549. Graduate Seminar in Instructional Design and Technology. 3 Credits.
Seminar on critical reading and writing related to scholarship in the field of Instructional Design and Technology. Prerequisite: Program major or permission of instructor.

IDT 550. Theories and Models of Instructional Design. 3 Credits.
This course focuses on pedagogical theories from education and psychology as they relate to instructional design, and on alternate models of instructional design. Topics include epistemological views of knowledge, major schools of thought on the nature of learning, a survey of instructional and learning theories, and a survey of instructional design models. Particular emphasis is placed on the interrelation of theories, models, and practice in the field of instructional design. Prerequisite: Program major or permission of instructor.

IDT 560. Instructional Design Consulting. 3 Credits.
This course trains students in the theoretical, (e.g., needs analysis, change agency, data-driven decisions, solution specification) and practical (e.g., management of client relationship, project management skills, budgeting) of instructional design consulting. Role-play, response to an RFP, and discussion of modern approaches to managing the consulting process will be primary activities in this course. Prerequisites: Program major or permission of instructor; IDT 520.

IDT 570. Human Performance Technology. 3 Credits.
An overview of the Human Performance Improvement (HPI) and Human Performance Technology (HPT) models and processes. Particular emphasis on determining whether instructional interventions or performance improvement interventions are called for, models and techniques for identifying performance gaps, specifying solutions, measuring results, and managing or adjusting the improvement. Job aids, electronic performance support systems, authoring tools, and other performance technologies will be covered. Prerequisites: IDT 500 and IDT 520.

IDT 580. Introduction to Web-Based Instruction. 3 Credits.
This course trains students to design and develop web-based instruction, including basic web site design tools and theory, design and development of online learning with course management systems, supporting technologies in web-based instruction, pedagogical approaches to the design and development of online learning environments. Prerequisites: Program major or permission of instructor; IDT 520.

IDT 584. Internship in Instructional Design and Technology. 2-4 Credits.
The internship is a culminating experience in which the student assumes responsibility for an instructional design and technology project. Repeatable to 4 credits. Repeatable to 4 credits.
IDT 590. Special Topics in Instructional Design and Technology. 1-3 Credits.
An in-depth study of a selected topic in instructional design and technology. Topics will vary with faculty expertise and current issues. Some topics would include simulations, instructional applications of the World Wide Web, performance support systems, adaptive testing, intelligent tutoring systems, and hypermedia applications. Repeatable to 3 credits.

IDT 591. Readings in Instructional Design and Technology. 1-3 Credits.
Selected readings with oral and written reports.

IDT 592. Research in Instructional Design and Technology. 1-3 Credits.
Supervised research in areas of student interest. Repeatable to 3 credits.

IDT 593. Directed Studies in Instructional Design and Technology. 1-3 Credits.
Individual project work in the design and development of technology-based instruction. All projects will require a final report. Repeatable to 3 credits.

IDT 995. Scholarly Project. 2 Credits.
The scholarly project demonstrates critical analysis and application of information and experiences gained throughout the program of study.

IDT 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

IDT 997. Independent Study. 2 Credits.
The independent study requires the student to investigate a topic related to the major field of study and to prepare a formal report summarizing this investigation.

IDT 998. Thesis. 4-9 Credits.
The thesis is an original research project completed. Repeatable to 9 credits. Repeatable to 9 credits.

Instructional Design and Technology Graduate Certificates

IDT offers three 12-credit certificates. The certificates provide minimum competencies in the field of instructional design within a given subset of the field (technology integration, corporate training, or eLearning). Certificates are intended for those already working in some capacity as an instructional designer but who lack an advanced degree in instructional design. Those seeking the full set of professional competencies of an instructional designer across all areas in preparation for entering the field of instructional design are encouraged to apply to one of the IDT master’s programs instead. Courses taken for a certificate may also be transferred into any of the IDT master’s programs at a later date.

IDT Certificate in K-12 Technology Integration

Required Courses (6 credits):

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Total credits 12

IDT Certificate in eLearning

Required Courses (6 credits):

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Total credits 12

IDT Certificate in Corporate Training and Performance

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</tr>
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<td>IDT 570</td>
<td>Human Performance Technology</td>
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Total credits 12

Master of Education in Instructional Design and Technology

Admission Requirements

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. An overall undergraduate grade point average of 2.75 or a junior/senior year grade point average of 3.00 for the Master of Education and Master of Science degrees, and for the certificate programs.
2. A 3.5 or better grade point average for all graduate work.
3. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as listed in the Graduate Academic Information section of the graduate catalog.
4. Two essay questions as part of the application process.

Provisional admission may be considered for students whose academic performance does not meet these criteria. Whether such consideration is given will depend on the circumstances and the judgment of the admissions faculty.

A basic knowledge of the microcomputer and substantial skill in using standard applications to produce work products (word processing, spreadsheet, drawing/ painting, graphing, and other common applications).

Degree Requirements

Students seeking the MEd degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the IDT program.

1. At least one-half of the credits must be at or above the 500 level.
2. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.

Required Courses

Core coursework in IDT 9
Additional coursework in IDT area of emphasis 6
Foundations coursework in education or psychology 6
Scholarly tools/research 3
Electives 6
Internship 2
Scholarly Project/Independent Study 2

Total Credits 34

The IDT degree options are based on the same set of program components:
through threaded discussion tools, take tests, and receive their grades. There are assignments and participation activities every week, whether the class meets live or not. In this way, students get the best of both worlds: the flexibility of online learning and the personal contact and connection of face-to-face instruction.

PhD Area of Emphasis in IDT
IDT also offers a doctorate through the Teaching and Learning PhD program, in which IDT is an area of emphasis. For details on this option, see the Teaching and Learning PhD (p. 384) program section in the graduate catalog.

Master of Science in Instructional Design and Technology

Admission Requirements
The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. An overall undergraduate grade point average of 2.75 or a junior/senior year grade point average of 3.00 for the Master of Education and Master of Science degrees, and for the certificate programs.
2. A 3.5 or better grade point average for all graduate work.
3. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.
4. Two essay questions as part of the application process.

Provisional admission may be considered for students whose academic performance does not meet these criteria. Whether such consideration is given will depend on the circumstances and the judgment of the admissions faculty.

Degree Requirements
Students seeking the MS degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the IDT program.

1. At least one-half of the credits must be at or above the 500 level.
2. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.

Required Courses
Core coursework in IDT 9
Additional coursework in IDT area of emphasis 9
Foundations coursework in education or psychology 3
Scholarly tools/research 6
Electives 3
Internship 2
Scholarly project or thesis 2-4
Total (34-thesis or 36-thesis) 36-38

The IDT degree options are based on the same set of program components:

1. Program core component: New courses presenting IDT content.
2. Research component: Development of research skills.
4. Area of Emphasis in IDT: Opportunity for area or skill specialization within IDT.

The IDT course requirements are organized within a major, foundations area, research/scholarly tools area, and area of emphasis. The major consists of the IDT core and the area of emphasis in IDT. Students in the MS degree program will be required to complete 18 credit hours of coursework in IDT subject matter. This requirement includes:

Core Coursework
IDT 500 Survey of Instructional Design 3
IDT 520 Instructional Systems Analysis and Design 3
IDT 525 Development, Implementation, and Evaluation of Instructional Materials 3

Degree Delivery Options
The IDT master’s and certificate programs are available for on-campus and distance delivery, making it possible to attain these degrees via distance delivery, on-campus attendance, or a combination of both. Online students and on-campus students are peers in the same class sessions and experience the same educational opportunities. Courses typically have a few synchronous (live) class sessions, where students may attend on-campus in the actual classroom or they may participate through our distance delivery system. In this manner, class lectures, discussion, presentation, and collaboration are done seamlessly, in a nearly identical fashion to traditional classes.

Asynchronous sessions (those done at the time and place of the students’ choosing each week) are handled through a course management system. Students use these tools to read material loaded by the teacher, turn in assignments, communicate through message boards, participate in discussions through threaded discussion tools, take tests, and receive their grades. There are assignments and participation activities every week, whether the class meets live or not. In this way, students get the best of both worlds: the flexibility of online learning and the personal contact and connection of face-to-face instruction.

PhD Area of Emphasis in IDT
IDT also offers a doctorate through the Teaching and Learning PhD program, in which IDT is an area of emphasis. For details on this option, see the Teaching and Learning PhD (p. 384) program section in the graduate catalog.
psycholinguistics, writing systems and language in social contexts. SS.

This course introduces the complexities of human language through the study of phonetics, phonology, morphology, syntax and semantics. Additional topics addressed include the brain and language, history of the English language, psycholinguistics, writing systems and language in social contexts. SS.

T&L 514. Introduction to Multilingual Education. 3 Credits.
This course explores language education models, programs and policies with an emphasis on English language learners (ELLs). Political, legal, historical, and cultural contexts of multilingual education will be discussed with a focus on both U.S. and global challenges.

T&L 515. Middle School Curriculum. 3 Credits.
This course examines the middle school curriculum and instructional strategies as well as the needs of early adolescents. The course focuses on the roles teachers play in incorporating a guided, interdisciplinary, collaborative team approach. The studies include the components of curriculum learning, advisory, exploration, learning communities and instruction (differentiation, cooperative learning, learning styles, instructional strategies) incorporated in middle schools.

T&L 516. Philosophy and Foundations of Middle School Education. 3 Credits.
This course examines the historical and philosophical background of middle level education. The focus is on the roles teachers/administrators play in incorporating this guided, interdisciplinary, collaborative team approach that assists students during these fundamentally transformative years. The course looks at the philosophical aspect of the curriculum and instructional component. The studies explore contemporary issues associated with the middle school as well as the adaptations necessary for special circumstances affiliated with middle schools.

T&L 517. Social Emotional Learning & Guidance. 3 Credits.
This course is designed to offer strategies for caregivers to support young children's positive social and emotional development, behavior, and learning through the exploration of how early experiences shape development. The emotional and social development of children, including the causes, expressions, prevention and management of challenging behaviors in all children birth to age eight are examined. Emphasis is placed on caregiver/family/child relationships, positive emotional/social environments, developmental implications, adverse childhood risk factors, and intervention strategies. Students will identify factors influencing emotional/social development, utilize screening measures, and design positive behavioral supports. SS.

T&L 518. Science in the Elementary School. 3 Credits.
A study of current trends and practices associated with teaching and assessing inquiry-based science in elementary classrooms.

T&L 519. Social Studies in the Elementary School. 3 Credits.
A study of current trends and practices associated with teaching and assessing social studies in elementary classrooms.

T&L 520. Curriculum and Instruction in the Elementary School. 4 Credits.
A study of processes for planning, implementing, and evaluating curriculum and improving instruction in elementary schools.

T&L 521. Differentiated Instruction. 3 Credits.
An introduction to the principles of differentiated instruction. Topics of study include: brain-based learning, responsive instructional and assessment strategies, linking curriculum standards to learner needs, organizing and managing a differentiated classroom, and relevant resources for implementation.

T&L 522. Mathematics in the Elementary School. 3 Credits.
A study of current trends and practices associated with teaching and assessing inquiry-based math in elementary classrooms.

T&L 523. Literacy Instruction for English Language Learners. 3 Credits.
This course addresses the foundations of teaching English language and literacy to English Language Learners (ELLs). Topics will include practices for reading and writing instruction, vocabulary development, assessment of reading and writing, choosing literature for ELLs, and the incorporation of media and technology in ELL literacy instruction. SS.

T&L 524. Reading in the Content Areas. 2 Credits.
How and why reading should be taught in the content areas (i.e. Social Studies, Science, Mathematics, etc.). Research studies in the field of content reading and a variety of instructional practices are reviewed.

T&L 525. Writing in the Classroom. 3 Credits.
This course examines writing as a process that is developmental, cultural, social, and individual. Emphasis is on effective implementation of the essential structures of writing workshop and on monitoring and assessing writers' growth.
T&L 526. Play in Development and Early Childhood Education. 3 Credits.
This course explores the role of play in cognitive, physical, and social-emotional development, and the way in which play is incorporated into educational and other programmatic settings. Students will explore how assessment of play indicates a child's development, and they will use assessment to promote Developmentally Appropriate Practices (DAP) for PreK-Grade 3 (ages 3-8) learners.

T&L 527. Curricular Foundations in Early Childhood Education. 3 Credits.
This course examines the historical, philosophical, cultural, race, class, and gender influences on curriculum in early childhood, including the philosophy and mission of the Department of Teaching and Learning.

T&L 528. Children’s and Young Adult Literature in the Classroom. 3 Credits.
This course explores the major area of literature for children and young adults in response to two questions: What is the range of literature available for children and young adults today? In what ways might children’s and young adult literature be used in the classroom to promote literacy growth?. SS.

T&L 529. Language Development & Cognition in Children. 3 Credits.
This course provides foundational information about language and cognitive development in children. The course content will also analyze typical and atypical language and cognitive development. The focus of the course will include children birth to age eight.

T&L 530. Foundations of Reading Instruction. 3-4 Credits.
This course focuses on the relationship between reading theory, research, contemporary issues and instructional practice. Emphasis is placed on strategic systems related to effective reading, instructional approaches that support the development of these strategic systems and assessment as collecting evidence of effective reading behaviors.

T&L 531. Early Literacy Development and Instruction. 3 Credits.
A study of early literacy processes including phonemic and print awareness, word recognition, comprehension, and writing. Emphasis is on reviewing current research and theory, assessment and instruction practices, and bridging language and literacy development in literacy rich environments.

T&L 532. Leadership in Literacy. 3 Credits.
The role of the literacy coach is to support teachers in closing the gap between learners' performance and achievement in reading and writing. Topics in this course will include providing leadership for a school's literacy program, collaboration with teachers and administrators, curriculum issues, knowledge of literacy standards, and professional development facilitation. On demand.

T&L 533. Secondary English Language Arts & Literacy Instruction. 3 Credits.
This graduate level course explores teaching literacy in the English Language Arts middle and high school classroom. Students will explore how the traditional and contemporary approaches to teaching literacy, nonfiction, and digital media work to support the advanced literacy goals of reading, writing, listening and speaking for adolescents. Students will explore Language Arts instructional methods and develop curriculum in the areas of literature, writer's workshop, academic inquiry, language vocabulary, and digital literacy. Students will also explore the ways the literacy program is supported and assessed throughout the entire secondary school.

T&L 534. Basic Reading Diagnosis and Remediation. 2 Credits.
Focuses on common causes of reading disability, methods of diagnosis, and corrective reading programs in the classroom. Corequisite: T&L 533.

T&L 535. Advanced Reading/Language Arts Diagnosis and Remediation. 2 Credits.
Analysis of interrelationships of learning difficulties in language arts areas and procedures for remediation. Prerequisites: T&L 530 and T&L 534.

T&L 536. Innovations in English Language Arts Instruction. 3 Credits.
This course considers the current curricular trends and research-based best practices in teaching English Language Arts. Students will critically examine and apply current instructional approaches in teaching English language and vocabulary, classroom discourse practices, and digital literacies. We will consider the ways various instructional methods support the advancement of literacy development for all students, considering ways to modify and adapt curriculum to meet the cultural and linguistic diversity of today's classrooms. On demand.

T&L 537. ELL Methods and Materials. 3 Credits.
This course explores current methods and materials in ELL education, with a focus on teaching academic language and sheltered content instruction. F,S,SS.

T&L 538. Supervision of Student Teaching. 2 Credits.
For supervisors and directors of student teaching in colleges and cooperating schools. Principles and practices on how to provide the most beneficial experiences for student teachers.

T&L 539. College Teaching. 3 Credits.
Explores learning styles and teaching styles, the components and responsibilities involved in college teaching, methods of teaching and motivating students, and current issues related to instruction in the college classroom.

T&L 540. Theory and Philosophies of Curriculum in Schools. 3 Credits.
This course explores the historical development of the K-12 curriculum, the philosophical and theoretical aspects applied to curriculum, and the social conditions that impact curriculum.

T&L 541. History of Higher Education in the United States. 3 Credits.
Study of major events and people shaping higher education in the U.S. Role, philosophy, and organization of institutions of higher education discussed.

T&L 542. Models of Teaching. 3 Credits.
This course focuses on various models of teaching: social interaction, information-processing, inquiry and behavioral. The purpose of the course is to provide teachers with a variety of instructional models related to meaningful learning experiences for students.

T&L 543. Scholarly Writing. 3 Credits.
Designed to assist students with learning the art of scholarly writing, this course will aid students in designing, formatting, and completing research-based and other scholarly writing projects, as well as understanding the rules and norms of academic publishing.

T&L 544. Assessment in Higher Education. 3 Credits.
A wide range of assessment issues in higher education will be explored. This includes course, program, and institutional assessment as well as classroom assessment techniques. Students will examine and understand the assessment process.

T&L 545. Adult Learners. 3 Credits.
This course will cover theories of adult development, current research on adult learners, ways of assessing the needs and interests of adult learners, and ways of creating environments in which adult learners can thrive.

T&L 546. College Students with Special Needs. 3 Credits.
This course explores the range of special needs college students bring to campus and how faculty, staff, and administrators might appropriately meet those needs. Prerequisite: Admission to the School of Graduate Studies or instructor permission. S.

T&L 547. Technology in Higher Education. 3 Credits.
Students will examine the various uses and integration of technology and media in higher education by faculty in their attempt to engage learners with each other, the course content, and with instructors.

T&L 548. The Professoriate. 3 Credits.
This course is a study of the development of the American professoriate by way of historical, scholarly, popular, and contemporary perspectives. It also examines the transition of new faculty members to their initial academic appointment.

T&L 549. Seminar. 1-4 Credits.
The seminar will focus on a specific topic relating to teaching and learning. The specific content will vary depending upon student needs and faculty resources. Repeatable. S/U grading.

T&L 550. Assessment and Evaluation in ELL Education. 3 Credits.
This course combines readings and theoretical discussion of assessment with hands-on experience in assessing ELLs. Students will learn how to use a variety of formal and informal assessments with a focus on how to use assessment data in planning instruction. Topics will include classroom-based assessments, language proficiency testing, testing accommodations for ELLs, and assessment of ELLs for special education and gifted education, and ELL program evaluation.

T&L 551. Second Language Acquisition for ELL Teachers. 3 Credits.
This course will explore the socio- and psycho-linguistic aspects of interlanguage by studying the theories and research of first and second language acquisition. Students will examine the nature of learners and their individual differences during the stages of language development, with a focus on children and K-12 classrooms.
T&L 553. Collaborative Relationships: Home, School and Community. 3 Credits.
A course appropriate for anyone working with families, early childhood educators, general educators, special educators, related service personnel, administrators and outside agency personnel. Topics covered include: (1) the various models of collaboration and consultation and the stages of each; (2) communication skills; (3) problem-solving; (4) conflict management; (5) diverse perspectives; (6) information collection procedures; (7) supervisory skills; (8) family characteristics and structure across the lifespan; (9) family focused intervention; (10) school choices; and (11) school issues such as poverty, domestic violence, teasing, bullying, and school violence.

T&L 558. Middle School Science and Engineering Lab1:Solids. 2 Credits.

T&L 559A. MS Sci.Eng-2: Solids. 3 Credits.
Prerequisites: T&L 558, admission to Graduate School, ND Teacher licensure and Admission to program "Improving Math and Science Literacy of Middle and High School Students of North Dakota Through Teacher-Faculty Partnerships".

T&L 559B. MS Sci.Eng-2: Solids. 3 Credits.
Prerequisites: T&L 558, admission to Graduate School, ND Teacher licensure and Admission to program "Improving Math and Science Literacy of Middle and High School Students of North Dakota Through Teacher-Faculty Partnerships".

T&L 566. Brain in Memory and Learning. 3 Credits.
Prerequisite: Admissions to Grad School.

T&L 567. Language Structure and Analysis for ELL Teachers. 3 Credits.
This course explores the grammatical and discourse structures of the modern English language, analysis of grammar and discourse with a focus on specific problem areas for ELLs, and pedagogical implications for English language development.

T&L 568. Research and Advocacy in TESOL. 3 Credits.
This course prepares teachers to both understand and conduct research in TESOL. Emphasis will be placed on using research data to advocate for changes and improvement in ELL education.

T&L 569. Action Research. 3 Credits.
The study of the philosophy and methods of action research. Emphasis is focused on analysis of and reflection on one's teaching for the purpose of improvements in student learning. Prerequisite: Graduate status.

T&L 571. Teacher Education. 3 Credits.
Practices, issues, and trends in the design and implementation and assessment of programs for the preparation and development of K-12 teachers.

T&L 572. Teacher Education: Focus on the Learner. 3 Credits.
The study of teacher education in relation to the lives of P-12 students. This course includes the examination of children and their lives through aspects of race, religion, socioeconomics, linguistics and age, and considers educational implications for preservice and inservice teachers.

T&L 573. Middle School Science and Engineering Lab2:Liq/Gas. 2 Credits.

T&L 574. MS Sci.Eng-4: Liquid/Gas. 3 Credits.
Prerequisites: T&L 573, admission to Graduate School, ND Teacher licensure and Admission to program "Improving Math and Science Literacy of Middle and High School Students of North Dakota Through Teacher-Faculty Partnerships".

T&L 575. Middle School Science and Engineering Lab3:Mot/Elec. 2 Credits.

T&L 576A. MS Sci.Eng-6:Motion/Electric. 3 Credits.
Prerequisites: T&L 575, admission to Graduate School, ND Teacher Licensure and employment as a teacher in a ND school.

T&L 576B. MS Sci.Eng-6:Motion/Electric. 3 Credits.
Prerequisite: T&L 576A.

T&L 577. Assessment of Learning. 3 Credits.
This course addresses the theory and practice of assessment, specifically the process of gathering and discussing information from multiple and diverse sources in order to develop a deep understanding of what students know, understand, and can do with their knowledge as a result of educational experiences.

T&L 578. Classroom Based Inquiry. 3 Credits.
Concepts learned in T&L 569 will be looked at in-depth and theoretical constructs such as Living Theory, Self Study, and Critical Theory constructs will be studied. Students plan and conduct an in-depth inquiry project within a school setting, complete the associated IRB, and create and academic poster and/or prepare a proposal of the Inquiry project for a professional setting. Prerequisites: TL graduate status and T&L 569; or by permission of instructor. F.S.

T&L 580. Practicum in Schools. 1-4 Credits.
Practicum in study of desirable school practices, observations in nearby schools, and application of research findings in solving practical problems. Prerequisites: Appropriate foundational and major area courses, and consent of the instructor and advisor. Repeatable.

T&L 581. Resident Internship. 4 Credits.
A full-time, year-long internship experience conducted in a cooperating school district. Interns are assigned as members of instructional teams with full responsibility for a portion of the cooperating school's instructional program. Prerequisites: Participation in the summer program prior to the internship and teaching licensure (see dept for approval).

T&L 582. Resident Internship. 4 Credits.
A full-time, year-long internship experience conducted in a cooperating school district. Interns are assigned as members of instructional teams with full responsibility for a portion of the cooperating school's instructional program. Prerequisites: Participation in the summer program prior to the internship and teaching licensure (see dept for approval).

T&L 583. Reading Clinic. 2 Credits.

T&L 584. Internship in Education. 1-8 Credits.
This is a culminating experience primarily for Sixth year and Doctoral students. The internships will be identified in one of the following sub-areas: (A) Educational Administration, (B) Special Education, (C) Curriculum, (D) Educational Research, or (E) Teacher Education. Prerequisites: Appropriate foundational, cognate, and major area coursework and consent of advisor and instructor. Repeatable.

T&L 589. Professional Development: Resident Teacher Program. 2 Credits.
This field-based experience provides mentoring and coaching, translates baccalaureate theory and research into practice, and requires active participation in the school placement and classroom setting. Issues and topics relevant to first year teachers and graduate education are emphasized through field work and discussions. Prerequisite: Admission into the Elementary Education Resident Teacher Program. SS.

T&L 590. Special Topics. 1-4 Credits.
Exploration of special topics in the study of education not regularly included in available course offerings. May be repeated for different topics. Prerequisite: Consent of instructor or advisor. Repeatable.

T&L 591. Readings in Education. 1-4 Credits.
Designed primarily for advanced graduate students. May be repeated for different topics. Prerequisite: Consent of instructor and advisor. Repeatable.

T&L 593. Independent Projects. 1-4 Credits.
Repeatable.

T&L 596. Individual Research in Education. 1-4 Credits.
Prerequisite: Consent of instructor and advisor. Repeatable.

T&L 995. Scholarly Project. 2 Credits.
The scholarly project demonstrates critical analysis and application of information and experiences gained throughout the program of study. The project allows students to demonstrate scholarly skills in an integrated manner that is directly related to their roles as teachers, program evaluators, and action researchers. The scholarly project must be approved by the student's advisor.

T&L 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

T&L 997. Independent Study. 2 Credits.

T&L 998. Thesis. 1-9 Credits.
Repeatable to 9 credits.

T&L 999. Dissertation. 1-15 Credits.
Repeatable to 15 credits.
Undergraduate Courses for Graduate Credit

T&L 322. Administration and Leadership in Early Childhood Education. 3 Credits.
An investigation of patterns of administration, curriculum organization, spatial resources, and staffing in early childhood settings, serving children 0-8 years old. Topics include federal and state laws and emerging trends in preschool and primary education in the state, region, and nation. Sixteen (16) hours of field experience. Prerequisite: Admission to the Teacher Education program. S.

T&L 422. Development of the Gifted and Talented. 2 Credits.
Research and theory for understanding the development needs of the more able child in early childhood and in educational experiences. S.

T&L 423. Assessment and Individualized Planning in Special Education. 3 Credits.
A study of the principles and practices of: (1) obtaining diagnostic information on school-related problems of a student; (2) assimilating this information and prescribing appropriate alterations based on continuous measurement data. Prerequisites or Corequisites: TL 315 and T&L 319. F,S.

T&L 493. Workshop. 1-4 Credits.
Special problems in Special Education; consideration of special problems of concern to the Special Education teacher and other educators. Repeatable to 8 credits. F,S.

Master of Education in Reading Education

Admission Requirements

For the M.Ed., teacher licensure at one of the following levels: early childhood, elementary, middle or secondary education, or a baccalaureate degree in another field of study is required.

The Reading Education program follows the School of Graduate Studies requirements for a cumulative undergraduate minimum grade point average of 2.75 or a junior/senior year minimum grade point average of 3.00. Applicants must satisfy the School of Graduate Studies’ English Language Proficiency requirements as listed in the Graduate Academic Information section of the graduate catalog. Transcripts, recommendations, and a personal statement, i.e., a response to three essay prompts, are part of the School of Graduate Studies’ English Language Proficiency requirements as listed in the Graduate Academic Information section of the graduate catalog. Transcripts, recommendations, and a personal statement, i.e., a response to three essay prompts, are part of the School of Graduate Studies Admissions and the Education Admissions Process sections of the graduate catalog for additional information on degree and application requirements and procedures.

Degree Requirements

The M.Ed. degree requirements are based on the following components:

1. Core Requirements for the Reading Education major and literacy education electives: The courses in the major engage students in learning content about diverse readers, writers, and speakers; curriculum, methods of teaching and assessing; literacy theory and foundations; and professional perspective. T&L 583 Reading Clinic, one of the Core Requirements, involves students in a practicum experience in which they work with readers to apply their core knowledge about teaching literacy to diverse readers.
2. Cognate: Cognate courses are a selection of courses providing broad support to the major.

The M.Ed. Reading Education degree program requires coursework in three areas: The major (reading education), cognate, i.e., coursework that supplements the major, and foundations of education. The program culminates in T&L 995 Scholarly Project or T&L 997 Independent Study. With careful planning, most students can meet the course requirements for the North Dakota Reading Credential.

The credit hours for the M.Ed., Reading Education consist of:

T&L 524 Reading in the Content Areas 2
T&L 525 Writing in the Classroom 3
T&L 530 Foundations of Reading Instruction 3
T&L 534 Basic Reading Diagnosis and Remediation 2
T&L 536 Innovations in English Language Arts Instruction 3
T&L 583 Reading Clinic (corequisite with T&L 534) 2
Select one of the following: 3
T&L 528 Children’s and Young Adult Literature in the Classroom
T&L 531 Early Literacy Development and Instruction
T&L 532 Leadership in Literacy
T&L 533 Secondary English Language Arts & Literacy Instruction
T&L 995 Scholarly Project or T&L 997 Independent Study 2

Cognate

Sample choices: 6
T&L 569 Action Research
SPED 552 Inclusive Methods
T&L 540 Theory and Philosophies of Curriculum in Schools
T&L 577 Assessment of Learning
T&L 518 Science in the Elementary School
T&L 519 Social Studies in the Elementary School
T&L 522 Mathematics in the Elementary School
T&L 526 Play in Development and Early Childhood Education
T&L 529 Language Development & Cognition in Children
T&L 553 Collaborative Relationships: Home, School and Community

Other courses are suited to the cognate to this area, e.g., English Language Learner courses; courses outside of the department and college may also be acceptable; consult with your advisor.

Educational Foundations

EFR 500 Introduction to the Foundations of Education 3
Select one of the following: 3
EFR 506 Multicultural Education
EFR 501 Psychological Foundations of Education
EFR 502 Issues and Trends in Education
EFR 503 Historical Foundations of Education
EFR 504 Philosophical Foundations of Education
EFR 505 Sociological Foundations of Education
EFR 507 Gender, Sexuality and Education
EFR 508 Anthropological Foundations of Education

Total Credits 32

Master of Science in Reading Education

Admission Requirements

For the M.S., teacher licensure at one of the following levels: early childhood, elementary, middle or secondary education.

The Reading Education program follows the School of Graduate Studies requirements for a cumulative undergraduate minimum grade point average of 2.75 or a junior/senior year minimum grade point average of 3.00. Applicants must satisfy the School of Graduate Studies’ English Language Proficiency requirements as listed in the Graduate Academic Information section of the graduate catalog. Transcripts, recommendations, and a personal statement, i.e., a response to three essay prompts, are part of the School of Graduate
Special Education

M.S. in Special Education (p. 429)

M.Ed. in Special Education (p. 426)

Accelerated B.S.Ed. in Early Childhood Education with Minor in Special Education/M.Ed. in Special Education with Specialization in Early Childhood Special Education (http://und-public.coursera.com/graduateacademicinformation/departamentalcoursesprograms/education/specialeducation/accel2)


Courses

SPED 500. Introduction to Visual Impairment. 3 Credits.
A course which provides an overview of the field of visual impairment to include the following areas of emphases: History/Philosophy; Service-delivery models; medical, psychological and educational implications of partial vision or total blindness; curricula methods and materials; current issues/trends. F.

SPED 501. Diseases and Function of the Eye. 2 Credits.
A course which introduces students to: a) the structural parts of the eye and its functions; b) common ocular conditions and diseases and their implications for education; c) interpretation of medical eye examination reports; and d) special considerations for infant, school-age academic, multiply disabled and adult populations.

SPED 502. Braille Reading and Writing. 2 Credits.
In this course students learn: 1) to read and write the literary code of grade 2 braille and 2) to teach the literary code of grade 2 braille to students of all ages.

SPED 503. Orientation and Mobility/Visual Impairment. 2 Credits.
This course introduces students to basic orientation and mobility techniques used by specialists when working with individuals with low vision and blindness. Concept development, kinesiology, tactile map construction, dog guides, electronic mobility devices and parental involvement are topics covered with respect to various populations (i.e., infants, school-age children, and adults). S.

SPED 504. Communication Media and Methods/Visual Impairment. 3 Credits.
This course provides an overview of the communication devices and adaptive technology used by individuals with low vision and blindness. Students learn to read and write the braille codes for mathematics and music, do basic calculations on the abacus, brailer and talking calculator and gain familiarity with computers and software currently used in the field. Prerequisite: Consent of instructor. F.

SPED 505. Low Vision Assessment and Remediation. 3 Credits.
A course which focuses on children who have severe visual deficits but with proper training are able to utilize their vision for learning. Effects of low vision are studied with respect to psychological/sociological development, academic learning, skills of independent living, and vocational choice. Methods of assessing visual function are examined with emphasis on adaptations needed in the educational settings. Optical and non-optical aids are compared and evaluated. F.

SPED 506. Introduction to Emotional Behavioral Disorders. 3 Credits.
The historical perspective and the complexities of identification and characteristics of emotional disorders will be covered. Students will gain an understanding of service delivery models within a multisystems approach. F, S, SS.

SPED 507. Introduction to Intellectual Disabilities. 3 Credits.
The historical perspective and the complexities of identification and characteristics of developmental/cognitive disabilities will be covered. Students will gain an understanding of service delivery models within a multi-systems approach. F, S, SS.

SPED 508. Introduction to Learning Disabilities. 3 Credits.
The historical perspective and the complexities of identification and characteristics of learning disabilities will be covered. Students will gain an understanding of service delivery models within a multisystems approach. F, S, SS.

SPED 509. IEP Development. 2 Credits.
This course is an introduction to the individualized education plan (IEP) process, including an understanding of how to develop and write effective IEPs for students with disabilities. In addition, the IEP template and process used by the state of North Dakota (i.e., TIENET) will be addressed.

SPED 510. Introduction to Early Childhood Special Education. 3 Credits.
An introduction to the field of Early Childhood Special Education, primarily for students interested in entering the field. Issues such as program design, parent involvement, identification, infant education, and effects of disabilities will be covered. F, S, SS.
**SPED 511. Identification and Assessment of Young Children with Special Needs. 3 Credits.**
A study of the principles and procedures for screening, identifying and evaluating young children with special needs. Emphasis will be placed on exposing students to available assessment instruments and providing opportunities for actual testing of preschoolers. Prerequisite: Admission to one of the master's programs in special education.

**SPED 512. Methods and Materials for Preschool Children with Special Needs. 3 Credits.**
A comprehensive study of curricula, program development and intervention strategies for disabled children ages birth to 6. Prerequisite: Admission to one of the master's programs in special education.

**SPED 514. Intervention Strategies with Infants and Toddlers. 3 Credits.**
This course provides for study into the unique needs of infants and toddlers with disabilities as well as the delivery of intervention services to the very young child with disabilities and his/her family. SS.

**SPED 515. Professional Development. 1 Credit.**
This course will provide an orientation to the roles and responsibilities of being a resident teacher in special education. Restricted to resident teachers in special education.

**SPED 516. Collaborative Authentic Assessment in Early Intervention. 3 Credits.**
This course is designed to evaluate the historical perspectives and philosophical basis of early intervention; rationale for early intervention; link between assessment, intervention, and evaluation; early interactions between the developing child and the environment; normal developmental sequences and atypical development. Specific emphasis will be placed on the role of authentic assessment within the paradigm of supporting infants, toddlers and their families through everyday activities. S.

**SPED 521. Transition to Adult Life. 3 Credits.**
This course focuses on education, personal and vocational transition issues for students with disabilities across all grade levels into adult life. Assessment and transition program planning will be covered along with interagency collaboration skills and career awareness.

**SPED 522. Introduction to Gifted/Talented Education. 3 Credits.**
Historical and evolutionary research, theories, and philosophies for understanding the developmental and social-emotional needs of the more able child from early childhood through adolescence in educational experiences. Characteristics of G/T learners in the intellectual, leadership, academic, and creative realms; stereotypes; comorbidities; issues surrounding the identification of G/T learners; cultural and societal influences on the field; educational trends. Prerequisite: TL 315 or permission of the instructor.

**SPED 523. Assessment in Gifted/Talented Education. 3 Credits.**
Formal and informal assessments of characteristics of G/T learners in the intellectual, leadership, academic, and creative realms for identification and qualification for educational programming; assessment of readiness and content mastery. Ongoing assessment, progress monitoring, and data interpretation skills will be practiced. Issues surrounding the identification of G/T learners, including misdiagnosis, stereotyping, and bias will be critically evaluated. Legal issues surrounding this area, and cultural influences on data sources will be explored. Prerequisite: TL 315, and T&L 423 or SPED 551, or permission of the instructor.

**SPED 524. Teaching Methods in Gifted/Talented Education. 3 Credits.**
Methodological and pedagogical approaches for fulfilling the unique academic, intellectual, creative, social, and emotional needs of the more able child in the educational environment. Exploration and analysis of contributing research, theories, and philosophies for designing differentiated learning opportunities from early childhood through adolescence via multiple modes (i.e. Bloom's Taxonomy, Multiple Intelligence's, technologies, multicultural and creative materials, etc.); educational trends through curriculum design and the integration of formal and informal assessment data and national/state standards to create individualized learning goals through curriculum compacting, tiering, acceleration, academic planning, modifications, and mentorships. Exploration and analysis of curriculum models to suit various learning needs of the asynchronous child with multiple forms of exceptionality (LD, ED, ASD, ELL); legal, cultural, and stereotype issues affecting the implementation of enriched curriculum for the G/T child with comorbidities. Prerequisite: SPED 522.

**SPED 525. Legal/Ethical Aspects in Special Education. 3 Credits.**
This course covers the theory and study of special education law for children youth with disabilities. F,S,SS.

**SPED 528. Advanced Assistive Technology. 1 Credit.**
This course covers the types and functions of assistive technology for students with disabilities across a variety of settings, e.g., home, schools and community. Assistive technology assessment and a working knowledge of best practices of assistive technology in the lives of students will be addressed. Identification of funding sources and assistive technology resources will also be covered.

**SPED 530. Braille Code 1. 2 Credits.**
Students will complete seven initial self-paced learning units (chapters) consisting of lessons that will lead them to being a proficient Braille reader and writer. F.

**SPED 531. Braille Code 2. 2 Credits.**
Students will complete four final self-paced learning units (chapters) consisting of lessons that will lead them to being a proficient Braille reader and writer. Prerequisite or Corequisite: SPED 530. S.

**SPED 532. Visual Impairment/Early Intervention. 3 Credits.**
This course covers the purpose and principles of early intervention. It addresses the developmental needs of young children with visual impairments and effective strategies to meet those needs. It also covers the role of teachers of students with visual impairment in the early intervention program as well as key aspects of consultation, interdisciplinary collaboration, service coordination, and culturally sensitive family-centered services. S.

**SPED 540. Concepts and Principles in Behavior Analysis. 3 Credits.**
This course introduces definitions, characteristics, principles, processes and concepts of Applied Behavior Analysis. In addition, the philosophical assumptions and dimensions of the science of applied behavior analysis, including determinism, empiricism, parsimony, selectionism, pragmatism, and lawfulness of behavior will be addressed. Students will learn to differentiate between environmental and mentalistic explanations of behavior, and between conceptual, experimental, and applied analyses of behavior. F,S,SS.

**SPED 541. Methods and Applications in Behavior Analysis. 3 Credits.**
This course addresses behaviorally-based strategies to establish, strengthen, and weaken target behaviors. Fundamental elements of behavior change are reviewed, with a focus on selecting evidence-based tactics that utilize basic principles of behavior (reinforcement, punishment, extinction, and stimulus control), as well as utilizing appropriate parameters and schedules of reinforcement and punishment. Various procedures combining fundamental behavior principles are reviewed, modeled, practiced, and demonstrated to mastery and fluency. F,S,SS.

**SPED 542. Ethical and Professional Conduct for Behavior Analysts. 3 Credits.**
This course introduces ethical and professional considerations relevant in the professional practice of applied behavior analysis as well as the ethical and disciplinary standards of the profession. Students will become familiar with the ethical and professional conduct and legal issues relevant to Board Certified Behavior Analyst-level practitioners found in the Behavior Analyst Certification Board's Guidelines for Responsible Conduct for Behavior Analysts and Disciplinary and Ethical Standards and Disciplinary Procedures (2012), as well as the professional conduct consistent with the practice of applied behavior analysis. F,S,SS.

**SPED 543. Applied Behavior Analysis Supervision Across Settings and Populations. 3 Credits.**
This course will focus on client-centered responsibilities across settings, including identification of the problem and selection and implementation of interventions based on biological, medical, and environmental variables. The course will also address management of behavioral services and supervision of those responsible for carrying out behavior change procedures. F,S,SS.

**SPED 544. Research Methods in Behavior Analysis. 3 Credits.**
This course focuses on the measurement of behavior and the analysis of intervention effect using single-subject experimental design. Procedures for collection and display of behavioral data are demonstrated, practiced, and examined for reliability, validity, efficiency, and relevance to a variety of settings, with a focus on educational environments. Individualized measurement procedures are developed and implemented using a variety of single-subject design formats, and the contribution of single-subject research design to education, clinical practice, and scientific inquiry is examined. Ethical considerations of experimental analysis are examined. F,S,SS.
SPED 545. Assessment and Behavior Change Systems. 4 Credits.
This course will address the process of identifying behaviors targeted for change and the use of behavioral assessment techniques to identify and analyze behavior-environment relations for the purpose of developing successful, functionally-based intervention strategies. Students will learn a variety of methods for behavior assessment, interventions, analysis of interventions, experimental analysis, and interpreting outcomes including the use of practical behaviorally-based assessment tools such as checklists, rating scales, structured observation tools, and curricular assessments. F, S, SS.

SPED 546. Philosophical Underpinnings of Applied Behavior Analysis. 3 Credits.
This course will focus on the philosophical underpinnings of behavior analysis. Radical behaviorism will be discussed in depth as it relates to many topics including verbal behavior, creativity, reasoning, and thinking. F, S, SS.

SPED 551. Advanced Assessment in Special Education. 3 Credits.
Theory and practice of assessment, including formal and informal procedures for screening, identification and assessment of students with disabilities. Practical assignment included. Prerequisite: Admission to one of the master's programs in special education. F, S, SS.

SPED 552. Inclusive Methods. 3 Credits.
The study of a variety of methods and materials for teaching and assessing children and youth with learning and behavior problems in the general education classroom. F, S, SS.

SPED 553. Advanced Methods: Learning Disabilities. 3 Credits.
The study of specific strategies, methods, and materials for working with students with learning disabilities. Prerequisite: Admission to one of the master's programs in special education.

SPED 554. Advanced Methods: Emotional Behavioral Disorders. 3 Credits.
The study of specific strategies, methods, and materials for working with students with emotional/behavioral disorders. Prerequisite: Admission to one of the master's programs in special education. F, S, SS.

SPED 555. Advanced Methods: Intellectual Disabilities. 3 Credits.
This course is a masters level methods course designed for professionals seeking to extend their skills in the areas of instruction, functional (life skills) curriculum, program and curriculum development, and functional behavioral analysis for working with students with moderate to severe intellectual disabilities. Prerequisites: Graduate status and admission to one of the master's programs in special education. F, S, SS.

SPED 556. Progress Monitoring. 3 Credits.
This course covers all aspects of progress monitoring including what it is, how it works, the benefits of progress monitoring, various ways and strategies for conducting progress monitoring and how it functions in a Response to Intervention (RTI) model. Students will learn how to track students in reading, math, and written language by collecting data and then using that data to measure student progress and in instructional decision-making. The strongest research-based strategy for progress monitoring, curriculum-based measurement, will be covered in depth. Prerequisite: Admission to one of the master's programs in special education. F, S, SS.

SPED 557. Response to Intervention. 2 Credits.
This course will address common elements of Response to Intervention (RTI) including definition, components of successful RTI models, establishing RTI teams and building capacity for school-wide RTI implementation, the use of standard protocol in RTI implementation, monitoring progress in academics and behavior within RTI models, understanding guidelines for problem-solving/decision making in RTI, as well as the future direction of RTI. F, S, SS.

SPED 560. Introduction to Autism Spectrum Disorder. 3 Credits.
This is the introductory course in a sequence of interdisciplinary courses focusing on autism spectrum disorder. Its central purpose is to encourage parents and caregivers of individuals with autism spectrum disorder to engage in reflective thinking about and critical analysis of the many and varied issues, e.g., identification, educational placement, effective treatments, vocational training, related to the provision of quality lifelong supports for these individuals. Prerequisites: Completed degree from a related field of study, or seniors who have completed TL 315, and are completing an undergrad degree from a related field of study (see dept for approval). F, S, SS.

SPED 561. Methods for Autism Spectrum Disorder. 3 Credits.
This is a required course in a sequence of interdisciplinary courses focusing on autism spectrum disorder (ASD). Its central purpose is to address commonly implemented intervention strategies, particularly those considered to be evidence based or research supported in the field of ASD. This course examines the current literature base supporting various interventions and strategies with a focus on matching the needs and strengths of individuals with ASD to the most appropriate intervention method based on data driven practice and research support for a particular intervention. Prerequisite or corequisite: SPED 560. F, S, SS.

SPED 562. Autism Spectrum Disorder: Supports Across the Lifespan. 3 Credits.
This course is in a sequence of interdisciplinary courses focusing on autistic spectrum disorder (ASD). Issues related to parental reactions to diagnosis, stressors at home and school, strategies for empowering families, transitional situations for individuals with ASD, transitions to jobs and college, and legal issues will be explored. The central purpose of the course is threefold: a) to provide current information related to the chronic stressors experienced by caregivers for and family members of persons with ASD, b) to provide current information regarding career/vocational options related to transition from high school through adult life, e.g., young adults, middle-aged adults, older adults, and c) to provide current information regarding legal issues related to the provision of lifelong supports for persons with ASD. Prerequisite: Completed degree from a related field of study. Prerequisites or corequisites: SPED 560 and SPED 561. F, S.

SPED 563. Autism Spectrum Disorder: Medical Issues and Trends. 3 Credits.
This course is in a sequence of interdisciplinary courses focusing on autism spectrum disorders (ASD). The purpose of this course is to examine the historical perspective and complexities of the role of medicine and medically oriented interventions for individuals with ASD. Issues will be explored related to conducting wellness examinations, current and future medication treatments, genetics, collaboration, and resources. Prerequisite: A completed degree from a related field of study. Prerequisites or corequisites: SPED 560 and SPED 561. F, S.

SPED 564. Structured Teaching. 3 Credits.
This is an elective course in the sequence of interdisciplinary courses focusing on autistic spectrum disorder (ASD). Its central purpose is to encourage parents and caregivers of individuals with ASD to engage in reflective thinking about and critical analysis of this educational approach for these persons. Prerequisites or corequisites: SPED 560 and SPED 561. F.

SPED 565. Methods for Students with Asperger Syndrome. 3 Credits.
This course is in a sequence of interdisciplinary courses focusing on autistic spectrum disorders (ASD), specifically focusing on those individuals with diagnoses or high functioning autism, Aspergers, and ASD with lower levels of support needed. The purpose of this course is to equip individuals interacting and working with people with high functioning ASD the pertinent background knowledge and experience with the diagnosis and characteristics to effectively implement assessments, functional analysis, various methods and practices, and transition planning to support individuals with ASD and their families. Prerequisite: A completed degree from a related field of study. Prerequisites or corequisites: SPED 560 and SPED 561. SS.

SPED 566. Autism Spectrum Disorder: Intensive Early Intervention. 3 Credits.
This is an elective course in the sequence of interdisciplinary courses focusing on children with autistic spectrum disorder (ASD) birth to age six. Topics addressed will include basic characteristics of children with ASD birth to age six, the developmental implications for these children and their families, and research-supported early interventions utilizing a family-centered approach with an emphasis on natural learning opportunities. Prerequisite: A completed degree from a related field of study. F, S, SS.
Master of Education in Special Education

Admission Requirements for the M.Ed.
The Master of Education (M.Ed.) is designed for those who do not have a previous degree in education. This degree will have a pedagogy focus to build a foundation for the art and science of teaching.

1. A bachelor’s degree.
2. For students seeking a North Dakota teaching endorsement, T&L 315 Education of Exceptional Students, or its equivalent taken as either a prerequisite or corequisite with the master’s coursework.
3. For students seeking a North Dakota teacher endorsement, an elementary reading methods course and an elementary math methods course taken as either prerequisites or corequisites with the master’s coursework.
4. A cumulative grade point average (GPA) of at least 3.0 for the junior and senior years of undergraduate work (based on A = 4.00).
5. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.
Admissions Process

1. Complete the School of Graduate Studies online application.
2. Submit the application fee of $35.
3. Recommend three people who will complete the recommendation form:
   a. one from an employment supervisor or administrator;
   b. one from a professional colleague or university professor; and
   c. one from a professional of your choosing.
4. Send official transcripts from each institution attended to the School of Graduate Studies.
5. Complete the personal statement and attach it in the “essay” section of the application. The personal statement should address four questions:
   a. Explain how your experiences/interests reflect your capacity for the specialization area you are applying specifically (i.e., LD, EBD, ID, VI, ECSE, ASD, SES, G&T, General).
   b. Identify a behavioral or learning need with an individual whom you know professionally or personally, then describe how you approached managing it.
   c. Graduate school may be challenging due to competing demands for your time. Please address how you will navigate these challenges by utilizing your strengths.
   d. In this master’s program, you will receive constructive feedback to develop and/or enhance your skills. Explain how you have perceived and managed this type of feedback in your past experiences.

Descriptions of the Specialization Areas

Autism Spectrum Disorder (ASD): The ASD specialization area focuses on children, adolescents, and adults with ASD and addresses several aspects of ASD including characteristics, assessment, methods/strategies, interagency collaboration/support, and application in a field setting.

Early Childhood Special Education (ECSE): The ECSE specialization area focuses on children from birth to age nine and addresses various disabilities, primarily developmental in nature, and addresses several aspects of ECSE including characteristics, assessment, methods/strategies, all forms of development, (e.g., language, physical), and application in a field setting.

Emotional Behavioral Disorders (EBD): The EBD specialization area focuses on children and adolescents with both emotional and behavior disorders and addresses several aspects of EBD including characteristics, assessment, behavior and academic methods/strategies, and application in a field setting.

General Special Education: The general specialization area is a “design your own program” option. Students can choose courses from all of the courses offered by the special education program.

Gifted/Talented Education (GT): The GT specialization area focuses on children and youth with outstanding talent who perform or show the potential for performing at remarkably high levels of accomplishment when compared with others of their age, experience, or environment. The specialization area addresses characteristics, assessment, methods/strategies, and application in a field setting.

Intelliqtial Disabilities (ID): The ID specialization area focuses on children and adolescents with DCD (the federal law refers to this population as those with mental retardation) and addresses several aspects of ID including characteristics, assessment, methods/strategies, and application in a field setting.

Learning Disabilities (LD): The LD specialization area focuses on children and adolescents with learning problems that are not due to developmental, emotional, or cognitive disabilities and addresses several aspects of LD including characteristics, assessment, methods/strategies, and application in a field setting.

Special Education Strategist (SES): The SES specialization area is a cross-categorical area that encompasses all of the courses in the specialization areas of ID, ED, and LD. Since it addresses three disability areas, it is the largest specialization area in number of credits required.

Visual Impairment (VI): The VI specialization area focuses on children and adolescents who are visually impaired or blind and addresses several aspects of VI including characteristics, assessment, braille code, methods/strategies, orientation/mobility, and application in a field setting.

Degree Requirements

Students seeking the Master of Education degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Special Education Program.

1. A minimum of 32 credits is required for the degree. Additional credits may be needed for teacher licensure.
2. At least one-half of the credits must be at or above the 500 level.
3. A maximum of one-fourth of the credit hours may be transferred from another institution.
4. Preparation of a written independent study or scholarly project approved by the faculty advisor: Two credits of SPED 995 Scholarly Project or four credits of T&L 998 Thesis.
5. Passing of a written final comprehensive examination.
6. Nine credits of Special Education Core coursework (excluding students in the ABA specialization).

   a. SPED 525 Legal/Ethical Aspects in Special Education 3
   b. SPED 578 Behavior Management 3
   c. Select 1 of the Following:
      - SPED 500 Introduction to Visual Impairment 3
      - SPED 510 Introduction to Early Childhood Special Education 3
      - SPED 552 Inclusive Methods 3

7. Six credits of pedagogical coursework.

   a. T&L 590 Special Topics 1-4
   b. T&L 521 Differentiated Instruction 3
   c. T&L 542 Models of Teaching 3

8. In addition to #4 and #5 above, choose one or more specialization areas and complete the required courses and elective courses for a minimum total of 32 credits for the M.Ed. degree*:

Autism Spectrum Disorder (ASD)

Required Courses

- SPED 560 Introduction to Autism Spectrum Disorder 3
- SPED 561 Methods for Autism Spectrum Disorder 3
- SPED 567 Assessment in Autism Spectrum Disorder 3
- SPED 583 Internship: Autism Spectrum Disorder 1-6

Elective Courses

Select nine of the following: 18

- SPED 540 Concepts and Principles in Behavior Analysis 3
- SPED 544 Research Methods in Behavior Analysis 3
- SPED 558 Multi-Tier System of Supports 3
- SPED 562 Autism Spectrum Disorder: Supports Across the Lifespan 3
- SPED 563 Autism Spectrum Disorder: Medical Issues and Trends 3
- SPED 564 Structured Teaching 3
- SPED 565 Methods for Students with Asperger Syndrome 3
- SPED 566 Autism Spectrum Disorder: Intensive Early Intervention 3

Total Credits 28-33

Early Childhood Special Education (ECSE)

Required Courses

- SPED 510 Introduction to Early Childhood Special Education 3
- SPED 511 Identification and Assessment of Young Children with Special Needs 3
- SPED 512 Methods and Materials for Preschool Children with Special Needs 3
- SPED 589 Internship: Early Childhood Special Education 1-4
Elective Courses
Select six of the following:

- SPED 509  IEP Development
- SPED 514  Intervention Strategies with Infants and Toddlers
- SPED 516  Collaborative Authentic Assessment in Early Intervention
- SPED 528  Advanced Assistive Technology
- SPED 557  Progress Monitoring
- SPED 558  Multi-Tier System of Supports
- SPED 566  Autism Spectrum Disorder: Intensive Early Intervention
- SPED 590  Special Topics in Special Education (Infant/Toddler Mental Health)
- T&L 529  Language Development & Cognition in Children
- T&L 553  Collaborative Relationships: Home, School and Community

Additional credits from the other specialization areas 25-28

* If seeking special education endorsement in ECSE in North Dakota, confer with your advisor regarding these requirements. If seeking teacher certification in a state other than North Dakota, refer to that state’s requirements.

**Emotional Behavioral Disorders (EBD)**

Required Courses
- SPED 506  Introduction to Emotional Behavioral Disorders 3
- SPED 555  Advanced Methods: Emotional Behavioral Disorders 3
- SPED 509  IEP Development
- SPED 586  Internship: Emotional Behavioral Disorders 1-6

Elective Courses
Select five of the following:

- SPED 521  Transition to Adult Life
- SPED 528  Advanced Assistive Technology
- SPED 557  Progress Monitoring
- SPED 558  Multi-Tier System of Supports
- T&L 553  Collaborative Relationships: Home, School and Community

Additional credits from the other specialization areas 25-30

* If seeking special education endorsement in EBD in North Dakota, confer with your advisor regarding these requirements. If seeking teacher certification in a state other than North Dakota, refer to that state’s requirements.

**General Special Education**

Note that there are no additional required courses. A minimum of 25 credits can be selected from the following courses:

- SPED 500  Introduction to Visual Impairment 3
- SPED 501  Diseases and Function of the Eye 2
- SPED 503  Orientation and Mobility/Visual Impairment 2
- SPED 505  Low Vision Assessment and Remediation 3
- SPED 506  Introduction to Emotional Behavioral Disorders 3
- SPED 507  Introduction to Intellectual Disabilities 3
- SPED 508  Introduction to Learning Disabilities 3
- SPED 509  IEP Development 2
- SPED 510  Introduction to Early Childhood Special Education 3
- SPED 511  Identification and Assessment of Young Children with Special Needs 3
- SPED 512  Methods and Materials for Preschool Children with Special Needs 3
- SPED 514  Intervention Strategies with Infants and Toddlers 3
- SPED 516  Collaborative Authentic Assessment in Early Intervention 3
- SPED 521  Transition to Adult Life 3
- SPED 528  Advanced Assistive Technology 1
- SPED 532  Visual Impairment/Early Intervention 3
- SPED 540  Concepts and Principles in Behavior Analysis 3
- SPED 551  Advanced Assessment in Special Education 3
- SPED 554  Advanced Methods: Learning Disabilities 3
- SPED 555  Advanced Methods: Emotional Behavioral Disabilities 3
- SPED 556  Advanced Methods: Intellectual Disabilities 3
- SPED 557  Progress Monitoring 3
- SPED 558  Multi-Tier System of Supports 2
- SPED 560  Introduction to Autism Spectrum Disorder 3
- SPED 561  Methods for Autism Spectrum Disorder 3
- SPED 562  Autism Spectrum Disorder: Supports Across the Lifespan 3
- SPED 563  Autism Spectrum Disorder: Medical Issues and Trends 3
- SPED 564  Structured Teaching 3
- SPED 565  Methods for Students with Asperger Syndrome 3
- SPED 566  Autism Spectrum Disorder: Intensive Early Intervention 3
- SPED 567  Assessment in Autism Spectrum Disorder 3
- SPED 580  Practicum: Special Education 1-6
- SPED 590  Special Topics in Special Education 1-4
- T&L 553  Collaborative Relationships: Home, School and Community 3

**Gifted/Talented (GT)**

Required Courses
- SPED 522  Introduction to Gifted/Talented Education 3
- SPED 523  Assessment in Gifted/Talented Education 3
- SPED 524  Teaching Methods in Gifted/Talented Education 3
- SPED 584  Internship: Gifted/Talented 1-6

Elective Courses
Select five of the following:

- SPED 551  Advanced Assessment in Special Education
- SPED 557  Progress Monitoring
- SPED 558  Multi-Tier System of Supports
- T&L 553  Collaborative Relationships: Home, School and Community

Additional credits from the other specialization areas or other T&L courses approved by the advisor 25-30

* If seeking special education endorsement in GT in North Dakota, confer with your advisor regarding these requirements. If seeking teacher certification in a state other than North Dakota, refer to that state’s requirements.

**Intellectual (ID)**

Required Courses
- SPED 507  Introduction to Intellectual Disabilities 3
- SPED 551  Advanced Assessment in Special Education 3
- SPED 556  Advanced Methods: Intellectual Disabilities 3
- SPED 509  IEP Development
- SPED 587  Internship: Intellectual Disabilities 1-6

Elective Courses
Select six of the following:

- SPED 521  Transition to Adult Life
- SPED 528  Advanced Assistive Technology
- SPED 557  Progress Monitoring
- SPED 558  Multi-Tier System of Supports
- SPED 560  Introduction to Autism Spectrum Disorder
Special Education Strategist (SES)

**Learning Disabilities (LD)**

**Required Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPED 508</td>
<td>Introduction to Learning Disabilities</td>
<td>3</td>
</tr>
<tr>
<td>SPED 554</td>
<td>Advanced Methods: Learning Disabilities</td>
<td>3</td>
</tr>
<tr>
<td>SPED 509</td>
<td>IEP Development</td>
<td></td>
</tr>
<tr>
<td>SPED 588</td>
<td>Internship: Learning Disabilities</td>
<td>1-6</td>
</tr>
</tbody>
</table>

**Elective Courses**

Select six from the following: 15

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPED 521</td>
<td>Transition to Adult Life</td>
</tr>
<tr>
<td>SPED 528</td>
<td>Advanced Assistive Technology</td>
</tr>
<tr>
<td>SPED 557</td>
<td>Progress Monitoring</td>
</tr>
<tr>
<td>SPED 558</td>
<td>Multi-Tier System of Supports</td>
</tr>
<tr>
<td>T&amp;L 553</td>
<td>Collaborative Relationships: Home, School and Community</td>
</tr>
</tbody>
</table>

**Total Credits** 25-30

* If seeking special education endorsement in LD in North Dakota, confer with your advisor regarding these requirements. If seeking teacher certification in a state other than North Dakota, refer to that state's requirements.

Learning Disabilities (LD)

**Required Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPED 506</td>
<td>Introduction to Emotional Behavioral Disorders</td>
<td>3</td>
</tr>
<tr>
<td>SPED 507</td>
<td>Introduction to Intellectual Disabilities</td>
<td>3</td>
</tr>
<tr>
<td>SPED 508</td>
<td>Introduction to Learning Disabilities</td>
<td>3</td>
</tr>
<tr>
<td>SPED 551</td>
<td>Advanced Assessment in Special Education</td>
<td>3</td>
</tr>
<tr>
<td>SPED 554</td>
<td>Advanced Methods: Learning Disabilities</td>
<td>3</td>
</tr>
<tr>
<td>SPED 555</td>
<td>Advanced Methods: Emotional Behavioral Disorders</td>
<td>3</td>
</tr>
<tr>
<td>SPED 556</td>
<td>Advanced Methods: Intellectual Disabilities</td>
<td>3</td>
</tr>
<tr>
<td>SPED 509</td>
<td>IEP Development</td>
<td></td>
</tr>
<tr>
<td>SPED 586</td>
<td>Internship: Emotional Behavioral Disorders</td>
<td>1-6</td>
</tr>
<tr>
<td>SPED 587</td>
<td>Internship: Intellectual Disabilities</td>
<td>1-6</td>
</tr>
<tr>
<td>SPED 588</td>
<td>Internship: Learning Disabilities</td>
<td>1-6</td>
</tr>
</tbody>
</table>

**Elective Courses**

Select one from the following: 1

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPED 521</td>
<td>Transition to Adult Life</td>
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<tr>
<td>SPED 528</td>
<td>Advanced Assistive Technology</td>
</tr>
<tr>
<td>SPED 557</td>
<td>Progress Monitoring</td>
</tr>
<tr>
<td>SPED 558</td>
<td>Multi-Tier System of Supports</td>
</tr>
<tr>
<td>SPED 560</td>
<td>Introduction to Autism Spectrum Disorder</td>
</tr>
<tr>
<td>T&amp;L 553</td>
<td>Collaborative Relationships: Home, School and Community</td>
</tr>
</tbody>
</table>

**Total Credits** 25-40

* If seeking special education endorsement in SES in North Dakota, confer with your advisor regarding these requirements. If seeking teacher certification in a state other than North Dakota, refer to that state's requirements.

Visual Impairment (VI)

**Required Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPED 500</td>
<td>Introduction to Visual Impairment</td>
<td>3</td>
</tr>
<tr>
<td>SPED 502</td>
<td>Braille Reading and Writing</td>
<td>2</td>
</tr>
<tr>
<td>SPED 505</td>
<td>Low Vision Assessment and Remediation</td>
<td>3</td>
</tr>
<tr>
<td>SPED 585</td>
<td>Internship: Visual Impairment</td>
<td>1-6</td>
</tr>
</tbody>
</table>

**Elective Courses**

Select six of the following: 15

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPED 501</td>
<td>Diseases and Function of the Eye</td>
</tr>
<tr>
<td>SPED 503</td>
<td>Orientation and Mobility/Visual Impairment</td>
</tr>
<tr>
<td>SPED 504</td>
<td>Communication Media and Methods/Visual Impairment</td>
</tr>
<tr>
<td>SPED 509</td>
<td>IEP Development</td>
</tr>
<tr>
<td>SPED 521</td>
<td>Transition to Adult Life</td>
</tr>
<tr>
<td>SPED 528</td>
<td>Advanced Assistive Technology</td>
</tr>
<tr>
<td>SPED 530</td>
<td>Braille Code 1</td>
</tr>
<tr>
<td>SPED 531</td>
<td>Braille Code 2</td>
</tr>
<tr>
<td>SPED 532</td>
<td>Visual Impairment/Early Intervention</td>
</tr>
<tr>
<td>SPED 557</td>
<td>Progress Monitoring</td>
</tr>
<tr>
<td>SPED 558</td>
<td>Multi-Tier System of Supports</td>
</tr>
<tr>
<td>T&amp;L 553</td>
<td>Collaborative Relationships: Home, School and Community</td>
</tr>
</tbody>
</table>

**Total Credits** 24-29

* If seeking special education endorsement in VI in North Dakota, confer with your advisor regarding these requirements. If seeking teacher certification in a state other than North Dakota, refer to that state's requirements.

Master of Science in Special Education

**Admission Requirements for the M.S.**

**The Master of Science (M.S.) is for those who already have a degree in education. The M.S. will have a research to practice focus.**

1. A bachelor’s degree.
2. For students seeking a North Dakota teacher endorsement, T&L 251 Understanding Individuals with Different Abilities, or its equivalent taken as either a prerequisite or corequisite with the master’s coursework.
3. For students seeking a North Dakota teacher endorsement, an elementary reading methods course and an elementary math methods course taken as either prerequisites or corequisites with the master’s coursework.
4. A cumulative grade point average (GPA) of at least 3.0 for the junior and senior years of undergraduate work (based on A = 4.00).
5. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

**Admissions Process**

1. Complete the School of Graduate Studies online application.
2. Submit the application fee of $35.
3. Recommend three people who will complete the recommendation form:
   a. one from an employment supervisor or administrator;
   b. one from a professional colleague or university professor; and
   c. one from a professional of your choosing.
4. Send official transcripts from each institution attended to the School of Graduate Studies.
5. Complete the personal statement and attach it in the "essay" section of the application. The personal statement should address four questions:
   a. Explain how your experiences/interests reflect your capacity for the specialization area you are apply for specifically (i.e., LD, EBD, ID, VI, ABA, ECSE, ASD, SES, G&T, General).
b. Identify a behavioral or learning need with an individual whom you know professionally or personally, then describe how you approached managing it.

c. Graduate school may be challenging due to competing demands for your time. Please address how you will navigate these challenges by utilizing your strengths.

d. In this master’s program, you will receive constructive feedback to develop and/or enhance your skills. Explain how you have perceived and managed this type of feedback in your past experiences.

**Descriptions of the Specialization Areas**

**Applied Behavior Analysis (ABA):** The ABA specialization area includes coursework and an intensive practicum that focuses on concepts and principles, assessment and behavior change systems, methods and applications, ethics, and research methods. This specialization is approved by the Behavior Analyst Certification Board.

**Autism Spectrum Disorder (ASD):** The ASD specialization area focuses on children, adolescents, and adults with ASD and addresses several aspects of ASD including characteristics, assessment, methods/strategies, interagency collaboration/support, and application in a field setting.

**Early Childhood Special Education (ECSE):** The ECSE specialization area focuses on children from birth to age nine and addresses various disabilities, primarily developmental in nature, and addresses several aspects of ECSE including characteristics, assessment, methods/strategies, all forms of development, (e.g., language, physical), and application in a field setting.

**Emotional Behavioral Disorders (EBD):** The ED specialization area focuses on children and adolescents with both emotional and behavior disorders and addresses several aspects of ED including characteristics, assessment, behavior and academic methods/strategies, and application in a field setting.

**General Special Education:** The general specialization area is a "design your own program" option. Students can choose courses from all of the courses offered by the special education program.

**Gifted/Talented Education (GT):** The GT specialization area focuses on children and youth with outstanding talent who perform or show the potential for performing at remarkably high levels of accomplishment when compared with others of their age, experience, or environment. The specialization area addresses characteristics, assessment, methods/strategies, and application in a field setting.

**Intellectual Disabilities (ID):** The ID specialization area focuses on children and adolescents with DCD (the federal law refers to this population as those with mental retardation) and addresses several aspects of ID including characteristics, assessment, methods/strategies, and application in a field setting.

**Learning Disabilities (LD):** The LD specialization area focuses on children and adolescents with learning problems that are not due to developmental, emotional, or cognitive disabilities and addresses several aspects of LD including characteristics, assessment, methods/strategies, and application in a field setting.

**Special Education Strategist (SES):** The SES specialization area is a cross-categorical area that encompasses all of the courses in the specialization areas of ID, ED, and LD. Since it addresses three disability areas, it is the largest specialization area in number of credits required.

**Visual Impairment (VI):** The VI specialization area focuses on children and adolescents who are visually impaired or blind and addresses several aspects of VI including characteristics, assessment, braille code, methods/strategies, orientation/mobility, and application in a field setting.

**Degree Requirements**

Students seeking the Master of Science degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Special Education Program.

1. A minimum of 32 credits is required for the degree. Additional credits may be needed for professional licensure.

2. At least one-half of the credits must be at or above the 500 level.
3. A maximum of one-fourth of the credit hours may be transferred from another institution.
4. Two credits of SPED 995 Scholarly Project or four credits of T&L 998 Thesis.
5. Nine credits of Special Education Core Coursework (excluding students in the ABA specialization).
6. SPED 525 Legal/Ethical Aspects in Special Education 3
   SPED 578 Behavior Management 3
   Select 1 of the Following:
   SPED 500 Introduction to Visual Impairment 3
   SPED 510 Introduction to Early Childhood Special Education 3
   SPED 552 Inclusive Methods 3
7. Five to six credits of scholarly tools/assessment courses.
8. SPED 511 Identification and Assessment of Young Children with Special Needs 3
   SPED 544 Research Methods in Behavior Analysis 3
   SPED 545 Assessment and Behavior Change Systems 4
   SPED 551 Advanced Assessment in Special Education 3
   SPED 557 Progress Monitoring 3
   SPED 558 Multi-Tier System of Supports 2
   SPED 567 Assessment in Autism Spectrum Disorder 3
   SPED 590 Special Topics in Special Education 1-4
   T&L 569 Action Research 3
9. In addition to #4 and #5 above, choose one or more specialization areas and complete the required courses and elective courses for a minimum total of 32 credits for the M.S. degree*:

**Applied Behavior Analysis (ABA)**

**Required Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPED 540</td>
<td>Concepts and Principles in Behavior Analysis</td>
<td>3</td>
</tr>
<tr>
<td>SPED 541</td>
<td>Methods and Applications in Behavior Analysis</td>
<td>3</td>
</tr>
<tr>
<td>SPED 542</td>
<td>Ethical and Professional Conduct for Behavior Analysts</td>
<td>3</td>
</tr>
<tr>
<td>SPED 543</td>
<td>Applied Behavior Analysis Supervision Across Settings and Populations</td>
<td>2</td>
</tr>
<tr>
<td>SPED 544</td>
<td>Research Methods in Behavior Analysis</td>
<td>3</td>
</tr>
<tr>
<td>SPED 545</td>
<td>Assessment and Behavior Change Systems</td>
<td>4</td>
</tr>
<tr>
<td>SPED 546</td>
<td>Philosophical Issues in Behavior Analysis</td>
<td></td>
</tr>
<tr>
<td>SPED 580</td>
<td>ABA Intensive Practicum Level I</td>
<td>5</td>
</tr>
<tr>
<td>SPED 580</td>
<td>ABA Intensive Practicum Level III</td>
<td>5</td>
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</tbody>
</table>

**Autism Spectrum Disorder (ASD)**

**Required Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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</tr>
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<tbody>
<tr>
<td>SPED 560</td>
<td>Introduction to Autism Spectrum Disorder</td>
<td>3</td>
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<tr>
<td>SPED 561</td>
<td>Methods for Autism Spectrum Disorder</td>
<td>3</td>
</tr>
<tr>
<td>SPED 567</td>
<td>Assessment in Autism Spectrum Disorder</td>
<td>3</td>
</tr>
<tr>
<td>SPED 583</td>
<td>Internship: Autism Spectrum Disorder</td>
<td>1-6</td>
</tr>
</tbody>
</table>

**Elective Courses**

Select nine of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPED 540</td>
<td>Concepts and Principles in Behavior Analysis</td>
<td>3</td>
</tr>
<tr>
<td>SPED 562</td>
<td>Autism Spectrum Disorder: Supports Across the Lifespan</td>
<td>3</td>
</tr>
<tr>
<td>SPED 563</td>
<td>Autism Spectrum Disorder: Medical Issues and Trends</td>
<td>3</td>
</tr>
<tr>
<td>SPED 564</td>
<td>Structured Teaching</td>
<td>3</td>
</tr>
<tr>
<td>SPED 565</td>
<td>Methods for Students with Asperger Syndrome</td>
<td>3</td>
</tr>
<tr>
<td>SPED 566</td>
<td>Autism Spectrum Disorder: Intensive Early Intervention</td>
<td>3</td>
</tr>
</tbody>
</table>
Early Childhood Special Education (ECSE)

Required Courses
- SPED 510: Introduction to Early Childhood Special Education (3)
- SPED 511: Identification and Assessment of Young Children with Special Needs (3)
- SPED 512: Methods and Materials for Preschool Children with Special Needs (3)
- SPED 589: Internship: Early Childhood Special Education (1-4)

Elective Courses
Select six of the following: 15
- SPED 506: Introduction to Emotional Behavioral Disorders (3)
- SPED 507: Introduction to Intellectual Disabilities (3)
- SPED 508: Introduction to Learning Disabilities (3)
- SPED 509: IEP Development (2)
- SPED 510: Introduction to Early Childhood Special Education (3)
- SPED 511: Identification and Assessment of Young Children with Special Needs (3)
- SPED 512: Methods and Materials for Preschool Children with Special Needs (3)
- SPED 514: Intervention Strategies with Infants and Toddlers (3)
- SPED 516: Collaborative Authentic Assessment in Early Intervention (3)
- SPED 521: Transition to Adult Life (3)
- SPED 528: Advanced Assistive Technology (1)
- SPED 532: Visual Impairment/Early Intervention (3)
- SPED 540: Concepts and Principles in Behavior Analysis (3)
- SPED 551: Advanced Assessment in Special Education (3)
- SPED 554: Advanced Methods: Learning Disabilities (3)
- SPED 555: Advanced Methods: Emotional Behavioral Disabilities (3)
- SPED 556: Advanced Methods: Intellectual Disabilities (3)
- SPED 557: Progress Monitoring (3)
- SPED 558: Multi-Tier System of Supports (2)
- SPED 560: Introduction to Autism Spectrum Disorder (3)
- SPED 561: Methods for Autism Spectrum Disorder (3)
- SPED 562: Autism Spectrum Disorder: Supports Across the Lifespan (3)
- SPED 563: Autism Spectrum Disorder: Medical Issues and Trends (3)
- SPED 564: Structured Teaching (3)
- SPED 565: Methods for Students with Asperger Syndrome (3)
- SPED 566: Autism Spectrum Disorder: Intensive Early Intervention (3)
- SPED 567: Assessment in Autism Spectrum Disorder (3)
- SPED 580: Practicum: Special Education (1-6)
- SPED 590: Special Topics in Special Education (Infant/Toddler Mental Health) (3)
- T&L 529: Language Development & Cognition in Children (3)
- T&L 553: Collaborative Relationships: Home, School and Community (3)

Emotional Behavioral Disorders (EBD)

Required Courses
- SPED 506: Introduction to Emotional Behavioral Disorders (3)
- SPED 555: Advanced Methods: Emotional Behavioral Disabilities (3)
- SPED 509: IEP Development (3)
- SPED 586: Internship: Emotional Behavioral Disorders (1-6)

Elective Courses
Select six of the following: 15
- SPED 521: Transition to Adult Life (3)
- SPED 528: Advanced Assistive Technology (3)
- SPED 557: Progress Monitoring (3)
- SPED 558: Multi-Tier System of Supports (3)
- T&L 553: Collaborative Relationships: Home, School and Community (3)

Gifted/Talented (GT)

Required Courses
- SPED 522: Introduction to Gifted/Talented Education (3)
- SPED 523: Assessment in Gifted/Talented Education (3)
- SPED 524: Teaching Methods in Gifted/Talented Education (3)
- SPED 584: Internship: Gifted/Talented (1-6)

Elective Courses
Select five of the following: 15
- SPED 551: Advanced Assessment in Special Education (3)
- SPED 557: Progress Monitoring (3)
- SPED 558: Multi-Tier System of Supports (3)
- T&L 553: Collaborative Relationships: Home, School and Community (3)

Intelligent Disabilities (ID)

Required Courses
- SPED 507: Introduction to Intellectual Disabilities (3)
- SPED 551: Advanced Assessment in Special Education (3)
- SPED 556: Advanced Methods: Intellectual Disabilities (3)
- SPED 509: IEP Development (3)

General Special Education

Note that there are no additional required courses. A minimum of 15 credits can be selected from the following courses:
- SPED 501: Diseases and Function of the Eye (2)
- SPED 503: Orientation and Mobility/Visual Impairment (2)
- SPED 505: Low Vision Assessment and Remediation (3)
### Learning Disabilities (LD)

**Required Courses**
- SPED 508 Introduction to Learning Disabilities 3
- SPED 551 Advanced Assessment in Special Education 3
- SPED 554 Advanced Methods: Learning Disabilities 3
- SPED 509 IEP Development
- SPED 588 Internship: Learning Disabilities 1-6

**Elective Courses**
- Select five of the following: 15
  - SPED 521 Transition to Adult Life
  - SPED 528 Advanced Assistive Technology
  - SPED 557 Progress Monitoring
  - T&L 553 Collaborative Relationships: Home, School and Community

**Total Credits**
- 25-30

* If seeking special education endorsement in ID in North Dakota, confer with your advisor regarding these requirements. If seeking teacher certification in a state other than North Dakota, refer to that state’s requirements.

### Special Education Strategist (SES)

**Required Courses**
- SPED 506 Introduction to Emotional Behavioral Disorders 3
- SPED 507 Introduction to Intellectual Disabilities 3
- SPED 508 Introduction to Learning Disabilities 3
- SPED 551 Advanced Assessment in Special Education 3
- SPED 554 Advanced Methods: Learning Disabilities 3
- SPED 555 Advanced Methods: Emotional Behavioral Disorders 3
- SPED 556 Advanced Methods: Intellectual Disabilities 3
- SPED 509 IEP Development
- SPED 586 Internship: Emotional Behavioral Disabilities 1-6
- SPED 587 Internship: Intellectual Disabilities 1-6
- SPED 588 Internship: Learning Disabilities 1-6

**Elective Courses**
- Select one of the following: 1
  - SPED 521 Transition to Adult Life
  - SPED 528 Advanced Assistive Technology
  - SPED 557 Progress Monitoring
  - SPED 558 Multi-Tier System of Supports
  - SPED 560 Introduction to Autism Spectrum Disorder
  - T&L 553 Collaborative Relationships: Home, School and Community

**Total Credits**
- 24-29

* If seeking special education endorsement in VI in North Dakota, confer with your advisor regarding these requirements. If seeking teacher certification in a state other than North Dakota, refer to that state’s requirements.

### Visual Impairment (VI)

**Required Courses**
- SPED 500 Introduction to Visual Impairment 3
- SPED 502 Braille Reading and Writing 2
- SPED 505 Low Vision Assessment and Remediation 3
- SPED 585 Internship: Visual Impairment 1-6

**Elective Courses**
- Select six of the following: 15
  - T&L 553 Communication Media and Methods/Visual Impairment
  - SPED 501 Diseases and Function of the Eye
  - SPED 503 Orientation and Mobility/Visual Impairment
  - SPED 504 Communication Media and Methods/Visual Impairment
  - SPED 509 IEP Development
  - SPED 528 Advanced Assistive Technology
  - SPED 530 Braille Code 1
  - SPED 531 Braille Code 2
  - SPED 532 Visual Impairment/Early Intervention
  - SPED 533 Inclusive Methods
  - SPED 557 Progress Monitoring
  - SPED 558 Multi-Tier System of Supports
  - T&L 553 Collaborative Relationships: Home, School and Community

**Total Credits**
- 25-30

**Additional credits from the other specialization areas**

* If seeking special education endorsement in SES in North Dakota, confer with your advisor regarding these requirements. If seeking teacher certification in a state other than North Dakota, refer to that state’s requirements.

### Engineering

**Ph.D. in Engineering** (http://und-public.courseleaf.com/graduateacademicinformation/departmentalcoursesprograms/engineering/phd)

**Courses**
- ENGR 501. Energy, Resources and Policy. 3 Credits.
  Structured discussions of energy, resources and policy issues, related to energy security and national and global well-being, based on selected readings. Prerequisite: Consent of instructor.
- ENGR 502. Alternative Energy Systems. 3 Credits.
  Provides an interdisciplinary background in alternative energy systems. Any form of energy production different from traditional fossil fuel combustion falls in this category. Such alternate systems include energy production from biomass, gasification of wood and coal, geothermal energy, solar energy (wind energy, fuel cells, and photovoltaics), etc. Prerequisite: Consent of instructor.
- ENGR 556. System Dynamics I. 3 Credits.
  This course provides an introduction to the System Dynamics field of study which is a computer-aided approach to improving system performance through policy analysis and design. The knowledge and critical thinking skills gained from this course will enable students to work either independently or on interdisciplinary teams to effectively deal with problems arising from dynamically complex systems. Topics include: perspective and process; tools for systems thinking; the dynamics of growth; tools for modeling dynamic systems; instability and oscillation; model testing; and challenges for the future. F.
ENGR 558. System Dynamics II. 3 Credits.
This course builds on ENGR 556 System Dynamics I. This course will enable students to effectively plan and manage System Dynamics projects by providing knowledge and skill relating to advanced modeling techniques, software capabilities, and client engagement processes. Topics include: model building, documentation and presentation best practices; use of historical data; model calibration and testing techniques; advanced software features; group model building; and implementation challenges. Prerequisite: ENGR 556. S.

ENGR 562. Seminar in Engineering. 1 Credit.
Conference and reports on current developments in Engineering. Prerequisite: Admission to the Engineering Ph. Repeatable to 3 credits. S/U grading.

ENGR 590. Special Topics in Engineering. 1-6 Credits.
Investigations of special topics in energy engineering dictated by students and faculty interests. Repeatable. Prerequisite: Consent of instructor. Repeatable.

ENGR 599. Doctoral Research. 1-15 Credits.
Repeatable to 60 credits. Repeatable.

ENGR 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

ENGR 998. Thesis. 1-9 Credits.
Repeatable to 9 credits. Repeatable to 9 credits.

ENGR 999. Dissertation. 1-18 Credits.
Repeatable to 18 credits. Repeatable to 18 credits.

Undergraduate Courses for Graduate Credit
ENGR 410. Technology Ventures. 1-3 Credits.
The primary focus will be on developing techniques to formulate the strategic framework required to develop high-tech ventures. Successful techniques to take technology-intensive opportunities from concept to commercialization will be explored. Prerequisite: Permission of instructor. Repeatable to 6 credits. S.

Biomedical Engineering

M.S. in Biomedical Engineering (p. 434)
Ph.D. in Biomedical Engineering (p. 433)

Courses

BME 510. Graduate Cooperative Education. 1-3 Credits.
A practical research experience with an employer or another research laboratory closely associated with the student's academic research area. A written report and an oral presentation are required. Prerequisite: Advisor approval is required. Repeatable to 3 credits. S/U grading. F,S,SS.

BME 599. Doctoral Research. 1-15 Credits.
Doctoral research for Ph.D. students in BME. Repeatable to 15 credits. F,S,SS.

BME 630. Anatomy and Physiology for Biomedical Engineers. 6 Credits.
Biomedical engineering is a growing field of engineering that requires a fundamental understanding of human anatomy and physiology. This course is intended to provide a foundation for biomedical engineers with a focus on learning necessary terminologies, concepts, and functions essential to human anatomy and physiology. Prerequisite: Consent of instructor. F.

BME 670. Seminar for Biomedical Engineers. 1 Credit.
The purpose of the course is to practice communication skills in writing papers and preparing presentations. Prerequisite: Consent of instructor. Repeatable to 6 credits. F.

BME 690. Special Topics in Biomedical Engineering. 1-9 Credits.
Special topics for graduate students in BME. Repeatable to 9 credits. F,S,SS.

BME 996. Continuing Enrollment. 1-12 Credits.
Continuing enrollment for graduate students in BME. Repeatable to 12 credits. S/U grading. F,S,SS.

BME 997. MS Project. 1-3 Credits.
This is the course required for the students in non-thesis based MS program in BME. Prerequisite: Consent of advisor. Repeatable to 3 credits. F,S,SS.

BME 998. MS Thesis. 1-9 Credits.
Thesis for students in the thesis-based MS program in BME. Repeatable to 9 credits. F,S,SS.

BME 999. PhD Dissertation. 1-15 Credits.
Dissertation for Ph.D. students in BME. Repeatable to 15 credits. F,S,SS.

Doctor of Philosophy in Biomedical Engineering

The M.S. and Ph.D. programs in Biomedical Engineering are offered by UND and North Dakota State University (NDSU). The proposed programs would be offered jointly by UND’s College of Engineering and Mines, School of Medicine and Health Sciences, and NDSU’s College of Engineering.

Every M.S. or Ph.D. student will be associated with at least one of the following Biomedical Research Groups (BRGs):

- Biomechanics
- Biomaterials
- Bio-instrumentation
- Multi-scale, bio-system simulation and modeling
- Bio-Signals
- Other emerging areas as identified

Two separate graduate degree programs are offered:

- Master of Science (M.S.) in Biomedical Engineering
- Doctor of Philosophy (Ph.D.) in Biomedical Engineering

The student’s graduate committee for both the M.S. and Ph.D. must consist of at least one faculty member from NDSU.

Program Requirements

This program prepares students who have a strong interest in gaining in-depth knowledge in biomedical engineering at the graduate level. Specific requirements over and above the general UND Academic Catalog requirements are listed below.

Minimum Admission Requirements

1. Bachelor of Science degree from an ABET-accredited engineering program; or
2. Students holding a B.S. degree in other disciplines may be admitted to Qualified Status with an obligation to acquire the necessary background undergraduate engineering knowledge. The exact requirements will be determined on a case-by-case basis; and/or
3. Graduate Record Examination General Test for applicants from non-ABET accredited programs; and
4. Minimum GPA is 3.0 (4.0 scale) is required. Conditional admittance may be obtained for GPAs less than 3.0.

Degree Requirements (total 90 credits)

Required:

Anatomy-Physiology (3-6 credits) from the following:
 EE 590 Advanced Electrical Engineering Problems (Physiology and Anatomy for Biomedical Engineers) 6
 or
 BIOL 660 (NDSU - Animal Physiology) 3
 Seminar (3-6 credits, 1 credit per semester) taken from the following:
 ENGR 562 Seminar in Engineering 1
 EE 570 Seminar 1
 ENGR 790 (NDSU - Seminar) 1
 Classes related to BRG 12-15
 Dissertation 6-30
 Electives:
 Graduate Preparation, e.g., Grant Writing 3-6
 Internship (industrial, clinical or research lab) 3-6
 Electives: 1-36
The following courses may be considered for the above BRGs:

**Bioinstrumentation BRG**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 539</td>
<td>Electromagnetic Compatibility</td>
<td>3</td>
</tr>
<tr>
<td>EE 456</td>
<td>Digital Image Processing</td>
<td>3</td>
</tr>
<tr>
<td>EE 521</td>
<td>Digital Signal Processing</td>
<td>3</td>
</tr>
<tr>
<td>EE 545</td>
<td>Introduction to Biomedical Engineering</td>
<td>3</td>
</tr>
<tr>
<td>EE 550</td>
<td>Biomedical Instrumentation</td>
<td>3</td>
</tr>
<tr>
<td>ECE 683</td>
<td>(NDSU - Instrumentation for Engineers)</td>
<td>3</td>
</tr>
<tr>
<td>ECE 685</td>
<td>(NDSU - Biomedical Engineering)</td>
<td>3</td>
</tr>
<tr>
<td>ECE 796</td>
<td>(NDSU - Biomedical Photonics)</td>
<td>3</td>
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</tbody>
</table>

**Biomaterials BRG**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ME 490</td>
<td>Special Laboratory Problems</td>
<td>1-3</td>
</tr>
<tr>
<td>EE 545</td>
<td>Introduction to Biomedical Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CHE 593A</td>
<td>Special Topics (Biochemical Engineering)</td>
<td>1-3</td>
</tr>
<tr>
<td>CHEM 665</td>
<td>(NDSU - Principles of Physical Chemistry and Biophysics)</td>
<td>3</td>
</tr>
<tr>
<td>ECE 685</td>
<td>(NDSU - Biomedical Engineering)</td>
<td>3</td>
</tr>
<tr>
<td>ECE 701</td>
<td>(NDSU - Quantitative Drug Design)</td>
<td>2</td>
</tr>
<tr>
<td>CE 725</td>
<td>(NDSU - Introduction to Biomaterials, Materials in Biomedical Engineering)</td>
<td>3</td>
</tr>
<tr>
<td>MN 785</td>
<td>(NDSU - Biocompatibility Testing)</td>
<td>3</td>
</tr>
<tr>
<td>MN 786</td>
<td>(NDSU - Tissue Engineering)</td>
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**Biomechanics BRG**

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>ME 439</td>
<td>Introduction to Robotics</td>
<td>3</td>
</tr>
<tr>
<td>ME 490</td>
<td>Special Laboratory Problems</td>
<td>1-3</td>
</tr>
<tr>
<td>ME 529</td>
<td>Advanced Finite Element Methods</td>
<td>3</td>
</tr>
<tr>
<td>EE 545</td>
<td>Introduction to Biomedical Engineering</td>
<td>3</td>
</tr>
<tr>
<td>ECE 485</td>
<td>(NDSU - Biomedical Engineering)</td>
<td>3</td>
</tr>
<tr>
<td>ME 668</td>
<td>(NDSU - Introduction to Biomechanics)</td>
<td>3</td>
</tr>
<tr>
<td>ME 680</td>
<td>(NDSU - Biofluid Mechanics)</td>
<td>3</td>
</tr>
<tr>
<td>ME 743</td>
<td>(NDSU - Biomechanics of Impact)</td>
<td>3</td>
</tr>
<tr>
<td>ME 755</td>
<td>(NDSU - Fluid Mechanics for Bio/Nanotechnologies)</td>
<td>3</td>
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</tbody>
</table>

**Biosignals BRG**

<table>
<thead>
<tr>
<th>Course Code</th>
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<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>EE 456</td>
<td>Digital Image Processing</td>
<td>3</td>
</tr>
<tr>
<td>EE 508</td>
<td>Intelligent Decision Systems</td>
<td>3</td>
</tr>
<tr>
<td>EE 521</td>
<td>Digital Signal Processing</td>
<td>3</td>
</tr>
<tr>
<td>EE 539</td>
<td>Electromagnetic Compatibility</td>
<td>3</td>
</tr>
<tr>
<td>EE 545</td>
<td>Introduction to Biomedical Engineering</td>
<td>3</td>
</tr>
<tr>
<td>ECE 590</td>
<td>Advanced Electrical Engineering Problems (Engineering Computation)</td>
<td>3</td>
</tr>
<tr>
<td>ECE 590</td>
<td>Advanced Electrical Engineering Problems (Biomedical Signal Processing)</td>
<td>3</td>
</tr>
<tr>
<td>ECE 685</td>
<td>(Biomedical Engineering)</td>
<td>3</td>
</tr>
</tbody>
</table>

**Multi-Scale System Simulation and Modeling BRG**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 545</td>
<td>Introduction to Biomedical Engineering</td>
<td>3</td>
</tr>
<tr>
<td>ECE 685</td>
<td>(NDSU - Biomedical Engineering)</td>
<td>3</td>
</tr>
</tbody>
</table>

**List of Elective Courses:**

In addition to the following list, BRG courses can be considered as elective courses.

- PPT 500 Principles of Physiology and Pharmacology 6
- PPT 503 Advanced Pharmacology or Physiology 3
- PPT 505 Research Techniques 1-3
- BIMD 510 Basic Biomedical Statistics 2
- BIMD 516 Responsible Conduct of Research 2
- NURS 510 Adv Physiology/Pathophysiology I 3
- NURS 511 Adv Physiology/Pathophys II 3
- NURS 573 Research Funding 3
- BIOG 673 (NDSU - Methods of Biochemical Research) 3
- CHEM 771 (NDSU - Biochemistry of Proteins and Enzymes) 4
- CHEM 685 (NDSU - Methods of Polymer Characterization) 3
- CHEM 885 (NDSU - Biomedical Instrumentation) 2
- PSCE 611 (NDSU - Pharmacodynamics and Applied Therapeutics) 3
- NURS 702 (NDSU - Ethics/Policy) 3
- NURS 704 (NDSU - Advanced Cardiac Pharmacology) 3
- NURS 714 (NDSU - Advanced Pathophysiology I) 3
- NURS 716 (NDSU - Advanced Pathophysiology II) 3
- PHARM 685 (NDSU - Economic Outcomes Assessment) 3

Other classes as deemed appropriate by student’s advisory committee

**Master of Science in Biomedical Engineering**

The M.S. and Ph.D. programs in Biomedical Engineering are offered by UND and North Dakota State University (NDSU). The proposed programs would be offered jointly by UND’s College of Engineering and Mines, School of Medicine and Health Sciences, and NDSU’s College of Engineering.

Every M.S. or Ph.D. student will be associated with at least one of the following Biomedical Research Groups (BRGs):

- Biomechanics
- Biomaterials
- Bio-instrumentation
- Multi-scale, bio-system simulation and modeling
- Bio-Signals
- Other emerging areas as identified

Two separate graduate degree programs are offered:

- Master of Science (M.S.) in Biomedical Engineering
- Doctor of Philosophy (Ph.D.) in Biomedical Engineering

The student’s graduate committee for both the M.S. and Ph.D. must consist of at least one faculty member from NDSU.

**Program Requirements**

This program prepares students who have a strong interest in research-oriented engineering related to the medical device field. All of the general requirements for enrollment, participation, and completion of a degree documented in the UND Academic Catalog as appropriate shall be required.

The M.S. degree will be offered with two options: 1) thesis-based; and 2) non-thesis-based. Specific requirements over and above the general catalog requirements for both thesis-based and non-thesis-based options are listed below.
Admission Requirements

1. Bachelor of Science degree from an ABET-accredited engineering program; or
2. Students holding a B.S. degree in other disciplines may be admitted to Qualified Status with an obligation to acquire the necessary background undergraduate engineering knowledge. The exact requirements will be determined on a case-by-case basis; and/or
3. Graduate Record Examination General Test for applicants from non-ABET accredited programs; and
4. Minimum GPA of 3.0 (4.0 scale) is required. Conditional admittance may be obtained for GPAs less than 3.0.

Degree Requirements – Thesis-based (total 30 credits)

Required:
- Anatomy-Physiology (3-6 credits):
  - EE 590 Advanced Electrical Engineering Problems (Physiology and Anatomy for Biomedical Engineers) 6
  - or
  - BIOL 660 (NDSU - Animal Physiology) 3
- Seminar - 3 credits (1 per semester) taken from the following:
  - EE 570 Seminar 1
  - ENGR 562 Seminar in Engineering 1
  - ENGR 790 (NDSU - Seminar) 1
- Classes related to BRG (2-3 classes) 6-9
- Thesis 9

Electives:
- Internship (industrial, clinical, or research lab) 0-3
- Graduate Preparation, e.g., Grant Writing 0-3
- Elective courses approved by advisor 1-9

Degree Requirements – Non Thesis-based (total 30 credits)

Required:
- Anatomy-Physiology (3-6 credits from the following):
  - EE 590 Advanced Electrical Engineering Problems (Anatomy & Physiology for the Biomedical Engineer) 6
  - or
  - BIOL 660 (NDSU - Animal Physiology) 3
- Seminar (3 credits, 1 per semester) Seminar class can be taken from the following:
  - ENGR 562 Seminar in Engineering 1
  - EE 570 Seminar 1
  - ENGR 790 (NDSU - Seminar) 1
- Classes related to BRG (2-3 classes) 6-9
- Project 3

Electives:
- Internship (industrial, clinical or research lab) 0-3
- Graduate Preparation, e.g., Grant Writing 0-3
- Elective courses approved by advisor 1-15

Chemical Engineering

M.S. in Chemical Engineering (p. 437)
M.Eng. in Chemical Engineering (p. 436)
Ph.D. in Chemical Engineering (p. 436)

Courses

CHE 501. Advanced Transport Phenomena. 3 Credits.
This course is designed to give an advanced treatment of momentum, heat, and mass transfer suitable for graduate students in chemical engineering, mechanical engineering, and environmental engineering. This course will involve using advanced mathematics to model transport systems of importance in engineering science and design. Prerequisites: CHE 301 and MATH 266. S, even years.

CHE 503. Fuels Technology. 3-4 Credits.
Processing and utilization of low rank fuels.

CHE 504. Air Pollution Control. 3 Credits.
Identification of major air pollutants from stationary and mobile sources and methods of controlling their emissions; dispersion of air pollutants in the atmosphere; photochemical air pollution; federal and state regulations. Prerequisite: Background equivalent to CHEM 122, MATH 265, and PHYS 252 is expected.

CHE 505. Biochemical Engineering. 3 Credits.
Principles of biochemical engineering and methods for the analysis, design, operation, and monitoring of biochemical engineering processes and reactors. Application to biochemical engineering research. Prerequisite: CHE 321 or consent of instructor.

CHE 507. Advanced Unit Operations. 3-6 Credits.
One or more of the following: fluid flow, heat flow, evaporation, humidification and dehumidification, drying, gas absorption, distillation, and extraction. Prerequisite: Background equivalent to CHE 405 is expected.

CHE 508. Advanced Unit Operations. 3-6 Credits.
Continuation of the first semester's work in advanced unit operations.

CHE 509. Advanced Chemical Engineering Thermodynamics. 3 Credits.
Chemical Engineering processes from the standpoint of quantitative thermodynamics. Special emphasis on thermodynamics of chemical reactions. Prerequisite: Background equivalent to CHE 303 is expected. F, even years.

CHE 510. Advanced Chemical Process Control. 3 Credits.
Analysis and design of advanced chemical process control systems including: dead time compensation, feed forward and adaptive control, multivariable control, digital computer control and the use of Z-transforms to get the discretetime dynamic response of chemical process systems. Prerequisites: MATH 266 and CHE 408 or equivalents approved by the department.

CHE 511. Advanced Chemical Engineering Kinetics. 3 Credits.
Theory and practice of industrial chemical reactor design. Advanced topics in kinetics of industrial chemical reactors. Prerequisite: Background equivalent to CHE 421 is expected.

CHE 512. Transport Of Mass. 3 Credits.
Prerequisites: Background equivalent to CHE 305, CHE 321, and MATH 265 is expected.

CHE 515. Design of Engineering Experiments. 3 Credits.
Design and analysis of experimental data including block and factorial arrangements, significance of data, and mathematical modeling. Prerequisite: MATH 265.

CHE 520. Impurities in Combustion and Gasification Systems. 3 Credits.
This course is on the fate and behavior of fuel derived impurities in energy conversion systems and how impurities influence system design, operation and reliability. Prerequisite: CHEM 122.

CHE 525. Polymer Engineering. 3 Credits.
Basic polymer structures and characterization. Polymerization reactions and kinetics of condensation and chain growth polymerizations. Polymerization processes including bulk, suspension, solution, and emulsion polymerizations. Polymer processing technologies including extrusion, and injection molding. Prerequisites: CHE 321 and CHE 301.

CHE 530. Combustion Theory and Modeling. 3 Credits.
A theoretical and mathematical study of premixed and diffusion flames, laminar and turbulent combustion, solid fuel combustion and pollutant formation. Prerequisites or Corequisites: CHE 301 and CHE 303. S.

CHE 531. Rocket Propulsion. 3 Credits.
A theoretical and mathematical study of space flight, the thermodynamics of rocket propulsion, classification and formulation of propellants and their combustion characteristics, and rocket motors. Prerequisite or corequisite: CHE 303. F.
CHE 532. Explosives: Theory and Modeling. 3 Credits.
A theoretical and mathematical study of: the thermodynamics of deflagrations and detonations, classification and formulation of explosives and their combustion characteristics. Prerequisite or Corequisite: CHE 303. F.

CHE 535. Metallic Corrosion and Polymer Degradation. 3 Credits.
Reviews the forms of metal corrosion and of polymer degradation; discussion of control and mitigation techniques. F.

CHE 562. Seminar in Chemical Engineering. 1 Credit.
Conferences and reports on current developments in Chemical Engineering. Repeatable to 3 credits. S/U grading.

CHE 591. Research. 1-15 Credits.
Analysis, planning, and detailed study of definite problems; individual laboratory work on some selected problems to develop the power of independent investigation. Repeatable.

CHE 593A. Special Topics. 1-3 Credits.
Topics of current interest to be considered each semester. Regular grading. Repeatable to 9 credits.

CHE 593B. Special Topics. 1-3 Credits.
Topics of current interest to be considered each semester. S/U grading. Repeatable to 3 credits. S/U grading.

CHE 595. Design Project. 3-6 Credits.
A three to six credit course of engineering design experience involving individual effort and formal written report. Prerequisite: Restricted to the Master of Engineering students and subject to approval by the student's advisor.

CHE 597. Graduate Cooperative Education. 1-2 Credits.
A practical work experience with an employer closely associated with the student's academic area. Arranged by mutual agreement among student, department, and employer. Prerequisite: Approval of ChE graduate director. Repeatable to 4 credits. S/U grading. On demand.

CHE 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

CHE 997. Independent Study. 2 Credits.
CHE 998. Thesis. 1-9 Credits.
Development and documentation of scholarly activity demonstrating proficiency in Chemical Engineering at the master's level. Repeatable to 9 credits. F,S,SS.

CHE 999. Dissertation. 1-12 Credits.
Repeatable to 12 credits. F,S,SS.

Doctor of Philosophy in Chemical Engineering

Admission Requirements

The applicant must meet the School of Graduate Studies' current minimum general admission requirements as published in the graduate catalog.

1. B.S. degree in chemical engineering from an ABET accredited program with a GPA of at least 3.0 or a M.S. degree in chemical engineering with a GPA of at least 3.0. Students holding a B.S. degree in a science or other engineering field may be admitted to Qualified Status with an obligation to acquire background undergraduate engineering knowledge. The exact requirements will be determined on a case-by-case basis.
2. Graduate Record Examination General Test for those with undergraduate degrees from non-ABET accredited programs.
3. Satisfy the School of Graduate Studies' English Language Proficiency requirements as published in the graduate catalog.

Degree Requirements

1. A minimum of 30 semester credits of coursework with at least 21 credits resulting from chemical engineering courses at the 500-level.
2. Successful completion of the four core chemical engineering courses with an average GPA of 3.0 or above: CHE 501 Advanced Transport Phenomena, CHE 509 Advanced Chemical Engineering Thermodynamics, CHE 511 Advanced Chemical Engineering Kinetics and CHE 515 Design of Engineering Experiments.
3. Out of the remaining 18 credits of elective courses, up to 9 credits of graduate coursework may be from outside chemical engineering.
4. A maximum of nine semester credits may be transferred from another institution.

CHE 501 Advanced Transport Phenomena 3
CHE 509 Advanced Chemical Engineering Thermodynamics 3
CHE 511 Advanced Chemical Engineering Kinetics 3
CHE 515 Design of Engineering Experiments 3
CHE 591 Research 36-45
CHE 999 Dissertation 12

Total Credits 93-111

Master of Engineering in Chemical Engineering

Admission Requirements

The applicant must meet the Graduate School's current minimum general admission requirements as published in the graduate catalog.

1. B.S. degree in Chemical Engineering from an ABET accredited program. Students applying for the combined BSChE/MEngr degree should see the “Chemical Engineering Combined Degree (http://engineering.und.edu/chemical/graduate-program/combined-ms-bs-degree.cfm)” section for additional details.
2. An overall undergraduate GPA of at least 2.50 or a GPA of at least 3.00 for the last two years.
3. Satisfy the School of Graduate Studies' English Language Proficiency requirements as published in the graduate catalog.

Degree Requirements

Students seeking the Master of Engineering degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Chemical Engineering Department. The general degree requirements for the Master of Engineering degree set forth by the Chemical Engineering Department include:

1. A minimum of 30 semester credits of coursework with at least 21 credits resulting from chemical engineering courses at the 500-level.
2. Successful completion of the four core chemical engineering courses (12 credits) with an average GPA of 3.0 or above: CHE 501 Advanced Transport Phenomena, CHE 509 Advanced Chemical Engineering Thermodynamics, CHE 511 Advanced Chemical Engineering Kinetics and CHE 515 Design of Engineering Experiments.
3. Out of the remaining 18 credits of elective courses, up to 9 credits of graduate coursework may be from outside chemical engineering.
4. A maximum of nine semester credits may be transferred from another institution.
Master of Science in Chemical Engineering

Admissions Requirements

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. B.S. degree in chemical engineering from an ABET accredited program. Students applying for the combined BSChE/MS degree should see the “Chemical Engineering Combined Degree (http://engineering.und.edu/chemical/graduate-program/combined-ms-bs-degree.cfm)” section for additional details. Students holding a B.S. degree in a science or other engineering field may be admitted to Qualified Status with an obligation to acquire a background in chemical engineering.
2. An overall undergraduate GPA of at least 2.75 or a GPA of at least 3.00 for the last two years. (An overall GPA of at least 3.3 for the combined BSChE/MS degree is required).
3. Graduate Record Examination General Test for those with undergraduate degrees from non-ABET accredited programs.
4. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the Graduate catalog.

Degree Requirements

Students seeking the Master of Science degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Chemical Engineering Department.

Thesis Option:

• A minimum of 30 semester credits, including the credits granted for the thesis and the research leading to the thesis.
• At least one-half of the credits must be at or above the 500-level.
• A maximum of nine semester credits may be transferred from another institution.
• A thesis documenting research on a topic related to chemical engineering.

Independent Study

Required Courses

CHE 562 Seminar in Chemical Engineering 2
CHE 591 Research 3
CHE 998 Thesis 4

At least 21 credits of coursework from chemical engineering and related fields, which may include a minor or cognate. 21

Total Credits 30

Non-Thesis Option:

• A minimum of 32 credits, including credits granted for independent study.
• At least one-half of the credits must be at or above the 500-level.
• A maximum of nine semester credits may be transferred from another institution.
• Preparation of a written independent study report approved by the faculty advisor.
• Comprehensive final examination.

Required Courses

CHE 562 Seminar in Chemical Engineering 2
CHE 591 Research 4
CHE 997 Independent Study 2

At least 24 credits of coursework from chemical engineering and related fields. 24

Total Credits 32

Civil Engineering

M.S. in Civil Engineering (p. 440)

M.Eng. in Civil Engineering (p. 440)

Combined Degree in Civil Engineering (p. 438)

Ph.D. in Civil Engineering (p. 438)

Courses

CE 501. Mechanics of Materials II. 3 Credits.
Theories of stress and strain in two and three dimensions; transformation of stresses and strains in two and three dimensions; tensor notation; linear and nonlinear stress strain behavior; thermal stresses; isotropic, orthotropic, and anisotropic material behavior; yield criteria and theories of failure under combined stresses; energy methods; torsion of noncircular and thin walled sections; unsymmetrical bending; shear center; curved beams. Prerequisite: ENGR 203. On demand.

CE 502. Structural Stability. 3 Credits.
Concept of stability; equilibrium and energy methods; stability of columns, beam columns, and frames; inelastic buckling; stability by slope deflection and matrix methods; use of codes for the stability design of aluminum and steel columns and frames; torsional and lateral torsional buckling of beams and beam columns. Prerequisite: ENGR 203. On demand.

CE 503. Structural Dynamics. 3 Credits.
Single-degree and multi-degree of freedom systems; continuous systems; free and forced vibrations; harmonic and periodic excitations; viscous and non-viscous damping; pulse excitations; numerical methods for dynamic response; earthquake response of linear elastic buildings; structural dynamics in building codes. Prerequisites: ENGR 202 and ENGR 203. On demand.

CE 517. Transportation Asset Management. 3 Credits.
Course focused on the principles of transportation asset management with an emphasis on pavement management system (PMS). Network- and project-level pavement management processes will be discussed, but the emphasis will be on network-level. Bridge management system will also be covered. Prerequisites: ENGR 203 and a statistics course (MATH 321, CHE 315, ECON 210 or approved substitute). F., even years.

CE 518. Pavement Engineering. 3 Credits.
Structural pavement design concepts for flexible and rigid pavements; traffic and environmental loading factors; material characterization; hot mix asphalt design and analysis concepts, SuperPave mix design method, stresses and strains in flexible and rigid pavements, joints and load transfer of rigid pavements, fast track concrete, and construction issues. Prerequisite: CE 412; consent of instructor for undergraduate students. F.

CE 519. Sustainable Pavements. 3 Credits.
Sustainability concepts; overview of mix design, structural design, and construction methods of pavements; warm mix asphalts; recycling of asphalt and concrete pavements, perpetual pavement concepts, specialty pavements, environmental, economic, and social impacts of highway pavements. Prerequisite: CE 412; consent of instructor for undergraduate students. S.

CE 523. Applied Hydraulics. 3 Credits.
Study of advanced topics in hydraulics. Computer applications. Content will vary. Repeatable to 9 credits when topics vary. Prerequisite: CE 423. Repeatable to 9 credits.

CE 524. Open Channel Hydraulics. 3 Credits.
Study of advanced topics in open channel hydraulics. Computer applications. Prerequisite: CE 423.

CE 525. Surface Hydrology. 3 Credits.
Extreme rainfalls and flood frequency analysis, regionalization; runoff generations, routings, and basin modeling; urban storm water design; GIS and remote sensing applications in hydrology; recent techniques and development in surface hydrology. Prerequisite: CE 421.

CE 531. Environmental Engineering III. 3 Credits.
Unit Operation and process design for water and wastewater treatment; physical, chemical, and biological systems; plant design project, computer- assigned design analysis. Content emphasis will vary. Prerequisite: CE 431.

CE 532. Environmental Engineering IV. 3 Credits.
Advanced theory and special methods in municipal and industrial water and wastewater treatment including treatment plant control, equipment studies, nutrient removal, tertiary treatment and toxic pollutants control. Content emphasis will vary. Prerequisite: CE 431.
CE 533. Industrial Wastes. 3 Credits.
Industrial processes and waste characterization, regulatory law, specialized treatment systems, hazardous wastes, economic analysis; plant tours of potato, sugar, meat, dairy, paper and pulp products and metal plating industries. Prerequisite: CE 431.

CE 535. Hazardous Waste Management. 3 Credits.
Regulations, generation, storage, transportation, disposal, classification, fate and transport of contaminants, environmental audits, pollution prevention and management facilities, remediation alternatives, physical-chemical treatment, bio-remediation, stabilization/solidification, thermal processes. Prerequisites: CE 306 and CHEM 121.

CE 551. Plate and Slab Structures. 3 Credits.
Classical plate bending theory, rectangular and circular plates, slab analysis by energy and numerical methods, anisotropic plates, large deflection theory, buckling of thin plates. Prerequisites: ENGR 203 and CE 351.

CE 552. Thin Shell Structures. 3 Credits.
Differential geometry of shell theory, membrane and bending theories of shells, shells of revolution, stress analysis of domes, pressure vessels, and storage tanks, numerical methods, buckling of shells. Prerequisites: ENGR 203 and CE 351.

CE 555. Prestressed Concrete-Analysis and Design. 3 Credits.
Materials and systems of pre-stressing; pre-stress losses; post-tensioned and post-tensioned members; design of pre-stressed concrete beams by service load and ultimate strength methods; flexural design of composite beams and slabs; anchorage zone stresses and reinforcement; shear and torsion. Prerequisite: CE 453. On demand.

CE 556. Numerical and Matrix Methods of Structural Analysis. 3 Credits.
Methods of successive approximations and numerical procedures for solution of complex structural problems, matrix formulation of structural problems, flexibility and stiffness methods of analysis. Prerequisite: CE 351.

CE 557. Advanced Steel Design. 3 Credits.
Design and analysis of simple structural connections including both moment and shear connections; design and analysis of eccentric structural connections, plate girders, and composite structures; design and analysis for seismic loads; ASD and LRFD design. Prerequisite: CE 451; consent of instructor for undergraduate students. F.

CE 558. Theory of Plasticity. 3 Credits.
Rigorous study of classical theory of plasticity. Classical continuum mechanics concepts of stress and strain and elastic behavior discussed. Progressing into plastic behavior in materials, mathematical formulation of elastico-plastic constitutive relationship, practical engineering limit analysis, and application of plasticity theories in analysis using computer programs. Prerequisite: CE 451 or instructor approval; consent of instructor for undergraduates. S.

CE 562. Graduate Seminar in Civil Engineering. 1 Credit.
Conference and reports on current developments in Civil Engineering. Prerequisite: Admission to Civil Engineering Program; consent of instructor and School of Graduate Studies required for undergraduate students. Repeatable to 3 credits. S/U grading. F, S, SS.

CE 590. Special Topics. 1-6 Credits.
Investigation of special topics dictated by student and faculty interests. May be repeated up to a total of 6 credits. Prerequisite: Department approval. Repeatable to 6 credits.

CE 591. Civil Engineering Research. 1-12 Credits.
May be repeated to a maximum of 12 credits. Repeatable to 12 credits.

CE 595. Design Project. 3-6 Credits.
A three to six credit course of engineering design experience involving individual effort and formal written report. Repeatable to 6 credits. Prerequisites: Restricted to the Master of Engineering student candidate and subject to approval by the student’s advisor. Repeatable to 6 credits.

CE 597. Graduate Cooperative Education. 1-2 Credits.
A practical work experience with an employer closely associated with the student’s academic area. Arranged by mutual agreement among student, department, and employer. Prerequisite: Approval of CE Graduate Director or major advisor. Repeatable to 4 credits. S/U grading. On demand.

CE 599. Doctoral Research. 1-15 Credits.
Research contributing to the discovery and dissemination of knowledge and/or technology in Civil Engineering and contributing to the student’s doctoral dissertation. Prerequisite: Admission to the PhD in Civil Engineering Program. Repeatable. F, S, SS.

CE 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

CE 997. Independent Study. 2 Credits.

CE 998. Thesis. 1-9 Credits.
Development and documentation of scholarly activity demonstrating proficiency in Civil Engineering at the master’s level. Repeatable to 9 credits. Repeatable to 9 credits.

CE 999. Dissertation. 1-18 Credits.
PhD student doctoral dissertation. Prerequisite: Admission to the PhD in Civil Engineering Program. Repeatable to 18 credits. S/U grading. F, S, SS.

Undergraduate Courses for Graduate Credit

CE 412. Soil Mechanics. 3 Credits.
Course topics include principles of soil mechanics including weight-volume relationships, classification, compaction, effective stress, permeability and seepage, consolidation, shear strength, site exploration, introduction to lateral earth pressure, and slope stability. Prerequisite: ENGR 203. F.

CE 414. Foundation Engineering. 3 Credits.
Soil improvements and ground modifications, soil exploration and sampling, bearing capacity, spread footings, mat foundations, settlement analysis, drilled shaft and pile foundations, foundations on difficult soil. Prerequisite: CE 412. S.

CE 418. Soil Mechanics Laboratory. 1 Credit.
Materials testing and field instrumentation for soil mechanics. S.

CE 434. Environmental Engineering Laboratory. 4 Credits.
Physical, chemical and biological methods used in environmental engineering, water chemistry, instrumental methods, lab tours. On demand.

CE 444. Contracts and Specifications. 3 Credits.
Engineering contracts and specification essentials, legal aspects of engineering practice and employment; professional practice issues; procurement of work; governmental regulation. S.

Combined Degree in Civil Engineering

To encourage undergraduate engineering students to extend their studies to include a graduate degree, the College of Engineering and Mines has a combined program that permits students to earn both a bachelor's and master's degree in an engineering discipline. This program allows students to designate two three-credit graduate courses to count for both degrees. The selected courses must have graduate course standing and be designated when a student requests admission to the program.

Students may be admitted to the Civil Engineering Combined Degree program after the completion of 95 credit hours toward the bachelor's degree with a GPA of at least 3.3 and before completion of the bachelor's degree. The student is admitted to the School of Graduate Studies' on completion of 125 credit hours for the bachelor's degree.

Doctor of Philosophy in Civil Engineering

Admission Requirements

1. A baccalaureate degree in an engineering discipline with a GPA of 3.3 or higher or a Master of Science degree in an engineering discipline with a GPA of 3.0.
2. Satisfy the School of Graduate Studies' English Language Proficiency requirements as published in the Graduate Catalog.
3. In addition to meeting the general provisions in the UND graduate catalog and the minimum requirements in items 1-2 above, candidates are assessed using a holistic process that considers Student's Record of Publications, GRE test scores (for students who are applying with a B.S. engineering degree from an non-ABET accredited program), transcripts of previous college work, relevant research and work experience, letters of recommendation, research interests, and English language skills. Students must specify a track on their admission form to facilitate this evaluation.
4. A student holding a non-engineering degree or who does not meet the minimum requirements in items 1-2 above may apply to one of the Master of Science degree programs in the College of Engineering and Mines. Students successfully completing a UND M.S. engineering degree will be
considered to satisfy the requirements of items 1-2 above; however, these
students shall still be subject to the holistic evaluation process described in
item 3 with the exception that new GRE test scores will not be required.

5. Students admitted to an engineering M.S.C.E. program but meeting the
minimum requirements in items 1-2 above, may after one calendar year
and upon the recommendation of his/her advisory committee, request to
by-pass the master’s degree and work directly toward the Ph.D. degree.
The recommendation of the advisory committee shall be brought to a
vote by the program graduate committee relevant to the degree track
requested by the student. A minimum of one week before such a meeting,
the program graduate committee shall be notified and provided with
the student’s updated file which shall consist of the materials used for
application into the M.S.C.E. program, a transcript of all academic work
completed at UND, and any additional materials the student wishes to have
considered. If the recommendation is approved by the relevant graduate
committee, the student will be given the qualifying exam. Passing this exam
will advance the student to Approved Status in the Doctoral Program in
Civil Engineering.

Residence Requirements

The purpose of residence requirements is to provide an opportunity for a
sustained and concentrated intellectual effort, to provide for immersion in an
academic research environment, and to permit extensive interaction with fellow
students and faculty of the Civil Engineering Department. Within the first two
years of graduate work at UND, at least two consecutive semesters must be
completed in residence. During residency, a student must be registered
for at least nine credits in a semester, or be a graduate research or teaching
assistant taking the appropriate credits to qualify as a full-time student. The
remainder of the credits required for a degree can be completed in a manner to
accommodate the student’s fiscal, family, job related, and other constraints with
the consent of the student’s adviser. The program of study must be completed
within the seven-year period normally allowed for graduate programs.

Under special circumstances, the student in conjunction with his/her advisory
committee and the Civil Engineering Graduate Committee, can petition the
Dean of the School of Graduate Studies for variances in this policy.

Degree Requirements

Students seeking the Doctor of Philosophy degree at the University of North
Dakota must satisfy all general requirements set forth by the School of
Graduate Studies as well as particular requirements set forth by the Civil
Engineering Doctoral Program.

The following requirements are in addition to the UND School of Graduate
Studies general requirements for the Ph.D.:

1. Completion of 90 semester credits beyond the baccalaureate degree
2. Maintenance of at least a 3.0 GPA for all classes completed as a graduate
   student.
3. Scholarly Tools: Proficiency in mathematics demonstrated by completing
   nine approved credits of mathematics intensive coursework (equivalent to
   UND 400-level or higher courses) with a grade of B or better which must
   include at least one course in numerical analysis. Scholarly tools courses
   taken for graduate credit after a student has enrolled in a graduate program
   at UND may be counted to fulfill requirements listed in Item 5 below.
4. A maximum of 30 credit hours can be transferred from a master’s program.
5. A minimum of 30 credit hours must be doctoral research and dissertation.
6. Exactly 3 credit hours of the CE 562-Graduate Seminar must be taken.
7. A minimum of 39 credit hours of coursework are required (up to 21 credit
   hours of coursework may be transferred from a master’s program in
   fulfilling this requirement subject to the credit transfer limits described in the
   general section of this graduate catalog). The coursework shall include a
   minimum of 27 credit hours of Civil Engineering (or relevance courses with
   the consent of the student’s advisor and advisory committee) coursework
   selected from the approved list of CE Ph.D. track courses published in the
   UND Academic Catalog. Equivalent graduate level coursework may be
   transferred from a master’s program.
8. Successful completion of a qualifying examination, taken no earlier than the
   end of their first year in residence and no later than the end of their second
   year of residence. The qualifying examination includes the following three
   sections.
The candidate will submit the dissertation to the examining committee at least four weeks prior to defense date. The examining committee consists of the PhD committee and an external examiner from outside the University. The external examiner is selected by the department’s graduate committee from a list of three candidates proposed by the advisor. The external examiner should not have any common publication with the student’s advisor or student and can be from academia or industry with an expertise relevant to the student’s research. The student and advisor should not contact the external examiner directly before or after.

3. The candidate must present and successfully defend the dissertation at the final examination (see School of Graduate Studies requirements [https://und.edu/academics/graduate-school]). Four results of the examination can be obtained: 1) pass; 2) minor revision 3) major revision and 4) fail. For minor revisions there is no need for another defense session and upon revising the dissertation the examining committee can pass the student. For major revisions the student is asked to fundamentally revise the methodologies and schedule another defense session. If failed, the student will not be able to obtain a PhD degree and may request to be reclassified as a master’s student and complete a Master of Science degree.

4. At least one peer reviewed journal article (as the first author) and one peer reviewed conference paper (as the first author) must be submitted with the consent of the advisor.

Master of Engineering in Civil Engineering

Admission Requirements

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. Bachelor of Science degree in Civil Engineering from an ABET accredited or equivalent program.
2. Graduate Record Examination General Test for applicants from non-ABET accredited programs.
3. A cumulative Grade Point Average (GPA) of at least 2.5 for all undergraduate work or a GPA of at least 3.0 for the junior and senior years of undergraduate work (based on A = 4.00).
4. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

Degree Requirements

Students seeking the Master of Engineering degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Civil Engineering Department.

1. A minimum of 30 semester credits in a major option, including the credits granted for the design project and the research leading to the design project.
2. At least one-half of the credits must be at or above the 500-level.
3. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.
4. Preparation of a written design project approved by the faculty advisor.
5. Comprehensive final examination.
6. Required Courses:

**Sole-Structures Option**

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<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CE 501</td>
<td>Mechanics of Materials II</td>
<td>3</td>
</tr>
<tr>
<td>CE 502</td>
<td>Structural Stability</td>
<td>3</td>
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<tr>
<td>ME 529</td>
<td>Advanced Finite Element Methods</td>
<td>3</td>
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<tr>
<td>CE 595</td>
<td>Design Project</td>
<td>6</td>
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<td>Electives</td>
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**Environmental Option**

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<tr>
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<th>Credits</th>
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<tbody>
<tr>
<td>CE 531</td>
<td>Environmental Engineering III</td>
<td>3</td>
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<tr>
<td>CE 532</td>
<td>Environmental Engineering IV</td>
<td>3</td>
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<tr>
<td>CE 533</td>
<td>Industrial Wastes</td>
<td>3</td>
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<tr>
<td>or CE 535</td>
<td>Hazardous Waste Management</td>
<td>3</td>
</tr>
<tr>
<td>CE 595</td>
<td>Design Project</td>
<td>6</td>
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<tr>
<td>Electives</td>
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**Water Resources Option**

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<th>Credits</th>
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<tbody>
<tr>
<td>CE 523</td>
<td>Applied Hydraulics</td>
<td>3</td>
</tr>
<tr>
<td>CE 524</td>
<td>Open Channel Hydraulics</td>
<td>3</td>
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<td>CE 525</td>
<td>Surface Hydrology</td>
<td>3</td>
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<td>or GE 417</td>
<td>Hydrogeology</td>
<td>3</td>
</tr>
<tr>
<td>CE 595</td>
<td>Design Project</td>
<td>6</td>
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<tr>
<td>Electives</td>
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<td>15</td>
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</tbody>
</table>

Master of Science in Civil Engineering

Admission Requirements

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. Minimum general admission requirements in the Admission section of the graduate catalog.
2. A baccalaureate degree in engineering or science from a recognized college or university.
3. Graduate Record Examination scores on the General Test will be required for those holding undergraduate degrees from other than ABET-accredited programs.
4. A cumulative Grade Point Average (GPA) of at least 2.75 for all undergraduate work or a GPA of at least 3.0 for the junior and senior years of undergraduate work (based on A = 4.00).
5. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

Degree Requirements

Students seeking the Master of Science degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Civil Engineering Department.

Degree requirements will be those listed by the School of Graduate Studies for the M.S. degree, both for the thesis option and the non-thesis option. There are no specific departmental degree requirements beyond those listed in the graduate catalog for the M.S. degree.

**Thesis Option:**

1. A minimum of 30 semester credits in a major field, including the credits granted for the thesis and the research leading to the thesis.
2. At least one-half of the credits must be at or above the 500-level.
3. A maximum of one-fourth (usually 8-9 semester credits) of the credit hours required for the degree may be transferred from another institution.
4. The program may include just the major, the major and a minor, or the major and a cognate area. The major must include 20 credits from the major department, and a minor or cognate area must include at least nine credits.
5. Preparation of a written thesis approved by the faculty advisory committee (CE 998 Thesis, 4-9 credits).
6. Comprehensive final examination.

**Non-Thesis Option:**

1. Thirty-two (32) credits including credits required for the major.
2. A minimum of two credits of Independent Study.
3. At least one-half of the credits must be at or above the 500-level.
4. A maximum of one-fourth (usually 8-9 semester credits) of the credit hours required for the degree may be transferred from another institution.
5. Preparation of a written independent study report approved by the faculty advisor (CE 997 Independent Study, 2 credits).
6. Comprehensive final examination.

Course offerings vary by semester based on student demand and instructor loads.

**Electrical Engineering and Computer Science, School of**

M.S. in Electrical Engineering (p. 449)

M.S. in Cyber Security (p. 447)

M.Engr. in Electrical Engineering (p. 447)

Combined B.S./M.S. or B.S./M.Engr. in Electrical Engineering (p. 446)

Ph.D. in Electrical Engineering (p. 446)

M.S. in Computer Science (p. 369)

M.S. in Data Science (p. 370)

Joint M.B.A/M.S. in Data Science (http://und-public.coursesleaf.com/graduateacademicinformation/departmentalcoursesprograms/computerscience/csci-ms-de-joint)

Ph.D. in Scientific Computing (p. 367)

**Program Collaborative Graduate Certificate in Cyber Security**

**Admission Requirements:**

1. B.S. or equivalent degree with a GPA of 2.75 or more from an educational institution of recognized standing.
2. At least 12 semester hours or equivalent of coursework in Computer Science, Computer Engineering, Electrical Engineering, Software Engineering, Information Technology, or Information Systems. An acceptable alternative to the coursework background is one or more years of directly related professional experience.

**Curriculum:**

**Summer 2017 - North Dakota State University**

CSCI 773 - Foundations of Digital Enterprise (online) - Ken Nygard 3

**Fall 2017 - Minot State University**

CSCI 568 - Applied Cryptography (online) - Paul Loree 3

**Spring 2018 - University of North Dakota**

EE 590 - Emerging Threats and Defenses (online) - Prakash Ranganathan 3

As early as Summer 2017 or Fall 2018 - NDUS Institution

Elective* 3

*Electives choices likely will include: Data Security; Cyber-Physical Security Systems Algorithms for Threat Modeling and Defenses; Cryptographic Methods; Next Generation E-commerce, and secure software coding.

Three-credit Project Course in Cyber Security with a faculty member mentoring a special project (UND, NDSU, MiSU):

1. EE 590. Information Security and Security Practices (Electrical Engineering, College of Engineering, UND)
2. CSci 783. Principles of Cyber Security (Computer Science, NDSU)
3. CSci 774. Topics of the Digital Enterprise (Computer Science, NDSU)

**Course Descriptions**

**EE 590 Emerging Threats, and Defenses.** Cyber-attacks are a serious economic and Security threat. To combat both immediate and future dangers, businesses and governments are investing in Cyber Security. Understanding trends in computer science and how machine learning and anti-malware defenses can respond to threats is a critical component of protecting networks, infrastructure and users. This course explores the growing challenges of securing sensitive data, networks to defend against malicious acts.

**CSCI 693. Foundations of Digital Enterprise.** This course is designed to familiarize individuals with current and emerging electronic commerce technologies using the Internet.

**CSCI 558. Applied Cryptography.** Cryptography is an indispensable tool for protecting information in computer systems. This course explains the inner workings of cryptographic primitives and how to correctly use them. Experience with C or C++ programming is required.

**Elective.** This is an independent study focusing on a particular Cyber related research topic taken at the individual institution that student may have enrolled. Experiential and applied learning are expected outcomes.

**CSCI Courses**

**CSCI 500. Graduate Orientation. 1 Credit.**

A discussion of various research and applied computing projects. Continued enrollment required of all graduate students until a research/project topic and an advisor are selected. S/U grading.

**CSCI 501. Topics in Computer Science. 1-3 Credits.**

Selected topics from current developments in Computer Science. Repeatable to 3 credits. Prerequisite: Permission of department. Repeatable to 3 credits.

**CSCI 513. Advanced Database Systems. 3 Credits.**

An advanced study of database system architecture, implementation, and applications, with emphasis on the object-oriented, object-relational, and embedded data models, and new database advancements including research and practical issues in database systems and data science. Prerequisite: CSCI 455.

**CSCI 515. Data Engineering and Management. 3 Credits.**

This course studies theoretical and applied research issues related to data engineering, management, and science. Topics will reflect state-of-the-art and state-of-the-practice activities in the field. The course focuses on well-defined theoretical results and empirical studies that have potential impact on data acquisition, analysis, indexing, management, mining, retrieval, and storage. Prerequisite: CSCI 513. S, even years.

**CSCI 522. Theoretical Foundations of Computer Science. 3 Credits.**

A selection of topics from theoretical computer science, possibly including formal languages, automata, other models of computation, and the theory of computability, decidability, and complexity. Prerequisite: CSCI 435.

**CSCI 532. High Performance Computing and Paradigms. 3 Credits.**

A study of current topics in threads, inter-process communication and synchronization, master-slave and peer designs for concurrency, client-server architectures, cluster/grid computing and massively parallel computer architectures. A considerable amount of programming will be done in one or more of these environments. F, odd years.

**CSCI 537. Graduate Cooperative Education. 1-2 Credits.**

A practical work experience in advanced computing, approved by the student's advisor. Requirements include a written report and an oral presentation upon completion of the work experience. Prerequisites: A minimum of 9 graduate credits in computer science and consent of the Department. S/U grading. On demand.

**CSCI 543. Machine Learning. 3 Credits.**

An introductory course in machine learning for data science. Topics include the learning algorithms of a Bayesian network, neural network, parametric/ non-parametric methods, kernel machine, support-vector machine, etc. for regression, classification, clustering, dimensionality reduction, etc. Prerequisite: CSCI 365 or CSCI 384. F, odd years.
CSCI 544. Soft Computing: Computational Intelligence I. 3 Credits. 
A study of the computational intelligence with the Soft Computing paradigm. The topics include the theory and computational methods of Fuzzy Logic and system, Neural Network, Evolutionary Algorithm and other topics, whose paradigms and hybrid techniques are widely applied to data science and mining, pattern classification and clustering, information retrieval, control engineering, decision making, and optimization problem, etc. S, even years.

CSCI 545. Discrete Dynamical Systems Modeling and Simulation. 3 Credits. 
A study of various modeling methods applicable to large scale distributed and parallel systems. Topics include cellular automata, grid models, and chaos theory. Prerequisite: CSCI 445.

CSCI 546. Advanced Computer Graphics. 3 Credits. 
An introduction to advanced topics in computer graphics. Included are light and color theory, image processing and compression, spatial-frequency transformations, raytracing, sampling theory, and topics of current interest. Prerequisites: CSCI 466 and MATH 265. S, even years.

CSCI 547. Scientific Visualization. 3 Credits. 
A study of visualization techniques useful in the analysis of engineering and scientific data. Topics include the study of physical models; methods of computational science; two -and three-dimensional data types; visual representation schemes for scalar, vector, and sensor data; isosurface and volume visualization methods. The course will also cover image processing and pattern recognition, with topics, including Fourier transforms, fractal geometry, and neural networks. Prerequisite: CSCI 466. F, even years.

CSCI 551. Security for Cloud Computing. 3 Credits. 
Cloud computing scheme aims to provide users with a shared computing infrastructure. The privacy and security concerns in cloud computing are different from the security concerns present in a dedicated data center. This course focuses on these security concerns and countermeasures for a cloud environment. This course provides an overview of cloud computing and virtualization, the critical technology underpinning cloud computing, and the major threats to the operations of cloud computing. Topics may include access control, identity management, denial of service, account and service hijacking, secure APIs, malware, forensics, regulatory compliance, trustworthy computing, and secure computing. Prerequisites: CSCI 370, CSCI 451; and one of the following: CSCI 327, CSCI 427 or CSCI 555. S, odd years.

CSCI 552. Cyber Physical Systems Security. 3 Credits. 
This course provides an introduction to security issues relating to various cyber-physical systems including industrial control systems and those considered critical infrastructure systems. Topics include: Industrial cyber security history and threats, hacking industrial control systems, securing industrial control systems, advanced cyber-physical systems security concepts, and privacy in cyber-physical systems. F, even years.

CSCI 554. Applications in AI/Computational Intelligence. 3 Credits. 
A continuous study of the computational paradigms of Soft Computing in the field of Computational Intelligence. The topics include the applications of the various computational paradigms in Computational Intelligence as well as more evolutionary algorithms in Swarm Intelligence. Prerequisite: CSCI 544. F, even years.

CSCI 555. Computer Networks. 3 Credits. 
A study of new and developing network architectures and communication protocols. Broadband technologies will be considered including BISDN, ATM networks, and other high-speed networks. Prerequisite: CSCI 327.

CSCI 562. Formal Specification Methods. 3 Credits. 
A foundational course that introduces several formal specification techniques for construction and analysis of software artifacts. Included are rigorous program development, abstract specifications of modules, and modeling of concurrent and distributed software. Prerequisites: CSCI 435 and CSCI 463.

CSCI 565. Advanced Software Engineering. 3 Credits. 
A study of current topics related to the design and implementation of large software systems. Course content may vary with instructor and student interest. Potential topics include: software testing and validation, programming environments, program metrics and complexity, design methodologies, software reliability and fault tolerance. Prerequisite: CSCI 463.

CSCI 566. Software Engineering Project. 3-6 Credits. 
The complete development of a useful software product, including specifications, design, documentation, coding, testing and verification. Students may work in teams. The project is supervised by the students' Independent Study Advisor. This course may not be used as an elective for the thesis option in computer science. Repeatable to 6 credits. Prerequisite: CSCI 463. Repeatable to 6 credits.

CSCI 575. Analysis of Algorithms. 3 Credits. 
The time and space complexity of classical computer algorithms is analyzed. NP hard and NP complete problems are characterized and illustrated. Prerequisite: CSCI 435.

CSCI 582. Software Architecture. 3 Credits. 
Software architecture is a fairly young sub-discipline within software engineering; it is aimed at shifting the designer's focus from algorithmic control structure to interactive interrelations among components. This course, among other things, will expose students to the concepts of design, design of design, principles and state-of-the-art methods and techniques in software architectures, which include the discussion of architectural patterns (or styles), domain specific architectural design, formal architectural description languages (AIDL), software connectors, component-level middleware, and middleware and component-based software development. Prerequisites: CSCI 463 and CSCI 435.

CSCI 588. Data Structure, Algorithms, and Software Design in C++. 3 Credits. 
This course is intended for the Scientific Computing Ph.D students. The course attempts to introduce C++ via laboratory sessions. More specifically, this course tries to incorporate Data Structures and Algorithms in C++ as well as Software Design in C++. During these sessions the students are introduced to C++ concepts using a series of examples. Having examined the examples given in the session and having understood the concepts covered, the student should be able to complete open-ended problems. This course assumes no prior knowledge of C++.

CSCI 591. Directed Studies. 1-3 Credits. 
An investigation of some specific area by an individual or small group of students working closely with a member of the graduate faculty. 1-3 credits in each graduate degree program. Prerequisites: Graduate standing and consent of instructor. Repeatable to 5 credits. F,S,SS.

CSCI 599. Research. 1-6 Credits. 
This course is intended for Ph.D students to obtain credit for their research efforts. Repeatable to 21 credits. Repeatable to 21 credits. S/U grading.

CSCI 996. Continuing Enrollment. 1-12 Credits. 

CSCI 997. Independent Study. 2 Credits. 
Independent Study.

CSCI 998. Thesis. 1-9 Credits. 
Thesis. Repeatable to 9 credits.

CSCI 999. Dissertation. 1-12 Credits. 
Dissertation. Repeatable to 12 credits. F,S,SS.

Undergraduate Courses for Graduate Credit

CSCI 427. Cloud Computing. 3 Credits. 
This is the undergraduate-level course on cloud computing models, techniques, and architectures. Cloud computing is an important computing model which enables information, software, and other shared resources to be provisioned over the network as services in an on-demand manner. This course introduces the current practices in cloud computing. Topics may include distributed computing models and technologies, Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS), Software-as-a-Service (SaaS), virtualization, performance and systems issues, capacity planning, disaster recovery, Cloud OS, federated clouds, challenges in implementing clouds, data centers, hypervisor CPU and memory management, and cloud hosted applications. S, even years.

CSCI 435. Formal Languages and Automata. 3 Credits. 
A study of automata, grammars, and Turing machines as specifications for formal languages. Computation is defined in terms of deciding properties of formal languages, and the fundamental results of computability and decidability are derived. Prerequisites: CSCI 242 with a grade of C or better and minimum second semester junior standing. F.
CSCI 445. Mathematical Modeling and Simulation. 3 Credits.
A study of various mathematical applications for digital computers, including the modeling, simulation and interpretation of the solution of complex systems. Prerequisites: CSCI 161 or CSCI 170, and MATH 166 and a statistics course. F, even years.

CSCI 446. Computer Graphics I. 3 Credits.
Introduction to computer graphics. Topics include raster scan graphics, 2D and 3D representations, affine transformations, light and color, texture mapping, image processing, ray-tracing, and computer animation. Team-based homework develops a 4 minute computer animation. Prerequisites: CSCI 242, CSCI 363, and MATH 166. F, odd years.

CSCI 448. Computer Graphics II. 3 Credits.
A continuation of CSCI 446. Topics covered include: history of games, game taxonomies, game design theory, computer game development, physics engines and AI engines. Prerequisite: CSCI 446, S, even years.

CSCI 451. Operating Systems I. 3 Credits.
Introduction to operating system theory and fundamentals. Topics include: CPU scheduling, memory management, file systems, interprocess communication facilities, security. Weekly homework assignments focus on process synchronization using fork/exe, threads, mutexes, pipes, semaphores, and shared memory. Prerequisites: CSCI 242 and CSCI 370; both with a grade of C or better. F.

CSCI 452. Operating Systems II. 3 Credits.
A study of the implementation of operating systems and parts of operating systems, and development of system software. Prerequisites: CSCI 451. On demand.

CSCI 455. Database Management Systems. 3 Credits.
Database concepts, database design (ER, UML), database programming languages (SQL), NoSQL Database, Database Concurrency and recovery techniques, and Database security. Prerequisite: CSCI 242 with a grade of C or better. S, even years.

CSCI 457. Electronic Commerce Systems. 3 Credits.
A study of the system architecture, content design and implementation, and data analysis, management, and processing of electronic commerce. Topics include Internet basics, business issues, data management and processing, static and dynamic web programming, e-commerce content design and construction, and databases and host languages with embedded SQL. Prerequisite: CSCI 260 with course topic of Dot Net. S, odd years.

CSCI 463. Software Engineering. 3 Credits.
This course teaches software engineering principles and techniques used in the specification, design, implementation, verification and maintenance of large-scale software systems. Major software development methodologies are reviewed. As development team members, students participate in a group project involving the production or revision of a complex software product. Prerequisites: CSCI 242 and CSCI 363. S.

CSCI 465. Principles of Translation. 3 Credits.
Techniques for automatic translation of high-level languages to executable code. Prerequisites: CSCI 365 and CSCI 370, F, odd years.

CSCI 491. Seminars in Computer Science. 1 Credit.
A course for advanced students. Repeatable to 3 credits. Prerequisite: Consent of instructor. Repeatable to 3 credits. S/U grading. F.S.

EE Courses

EE 503. Statistical Communications Theory and Signal Processing I. 3 Credits.
Theory of time series analysis of random signals as applied to signal processing is emphasized. Prerequisite: EE 411 or consent of instructor.

EE 504. Statistical Communications Theory and Signal Processing II. 3 Credits.
Advanced methods of signal detection including linear parameter estimation and non-linear estimation of parameters. Detection of signals and estimation of signal parameters from a probability point of view will be emphasized.

EE 505. Control Systems II. 3 Credits.
Advanced topics in control systems including nonlinear systems, robust control, optimal control, and pole placement techniques; selective topics from the state of the art. Prerequisite: EE 405.

EE 506. Digital Control Systems. 3 Credits.
Digital systems representation, analysis and simulation; Z-transform; digital controllers design and realization; microprocessor based controllers. Prerequisite: EE 405.

EE 507. Spacecraft Systems Engineering. 3 Credits.
Space environment, dynamics of spacecraft, celestial mechanics, mission planning, and systems engineering methodology.

EE 508. Intelligent Decision Systems. 3 Credits.
Systems and networks will be designed to work in an uncertain environment. Systems will be optimized using Neural Networks and Fuzzy Logic concepts. Prerequisite: EE 314 or consent of instructor.

EE 509. Signal Integrity. 3 Credits.
Fundamental concepts of signal integrity are presented. Topics include propagation of digital signals, electrical noise, and system timing. Prerequisite: EE 409 or consent of instructor.

EE 511. Power Electronics. 3 Credits.
Principles of power electronics switching control circuits. Including AC/DC, DC/DC, DC/AC converters, their harmonics and filtering techniques, and their application in switching power supplies, electric drives, renewable energy systems, etc. Prerequisite: EE 321 or consent of instructor. On demand.

EE 512. Wireless Communications. 3 Credits.
Key concepts, underlying principles, and practical applications of ever-growing wireless and cellular communication technologies. Prerequisite: EE 411 or consent of instructor.

EE 519. Digital Computer Logic. 3 Credits.
Logic design analysis of digital computers with some applications. Prerequisite: EE 451 or consent of instructor.

EE 520. Electronic Computing Systems. 3 Credits.
Design of bit slice computers; simulation of computers’ special purpose controller design; advanced microprocessor design and use. Prerequisite: EE 201 and EE 421.

EE 521. Digital Signal Processing. 3 Credits.
Modern methods of digital signal processing will be studied. Techniques that will be used include the recursive and nonrecursive discrete-time filters and the Fourier Transform. Prerequisite: EE 314.

EE 522. Renewable Energy Systems. 3 Credits.
This course will provide engineering students with an understanding of the principles of renewable energy conversion systems. Emphasis is on wind, photo-voltaic, hydrogen fuel, and fuel cell energy conversion and storage systems, along with their associated design and control issues.

EE 523. Power Systems II. 3 Credits.
Electric power systems analysis and control. Power flow; system response and stability; voltage and frequency control; computer methods in system analysis. Prerequisite: EE 423.

EE 524. Application Specific Integrated Circuit (ASIC) Design. 3 Credits.
To gain an historic perspective of ASIC Design. To familiarize students with the existing IC technology and their attributes. To recognize basic fabrication process, layout, circuit extraction and performance analysis. To understand CAD tools, hardware, systems engineering, and operational issues. Prerequisite: EE 421 or consent of instructor.

EE 525. Electromagnetic Fields. 3 Credits.
Static electric and magnetic fields, field mapping, and applications to transmission lines, wave-guides, and antennas. Prerequisite: EE 316.

EE 526. Engineering Systems Reliability. 3 Credits.
This course teaches the basics of reliability engineering concepts and techniques applicable to all engineering disciplines including electrical, mechanical, chemical, geological, aeronautical, and civil. To benefit the most from this course, some basic knowledge of probability and statistics would be helpful but it is not necessary as the required background and tools are presented and discussed in the class. Prerequisite: Consent of the instructor. On demand.

EE 530. Phased Array Antennas. 3 Credits.
Basic antenna and array characteristics, pattern synthesis techniques, analysis and design of radiating elements and feed networks, mutual coupling and array error analysis, adaptive arrays. Prerequisite: Consent of instructor. On demand.

EE 532. Antenna Theory. 3 Credits.
Physical principles underlying antenna behavior and design as applied to antennas. Prerequisite: EE 316 or consent of instructor.
EE 534. Advanced Wireless Communications Engineering. 3 Credits.
A combination of theory and practice underlying principles and practical applications of Wireless Communications. Prerequisite: Consent of Instructor. On demand.

EE 536. Optical Fiber Communications. 3 Credits.
Propagation in optical fibers, optical receivers, amplifiers, detectors, sources, transmission links, noise consideration, optical fiber communication systems, applications and future developments. Prerequisite: EE 434 or consent of instructor.

EE 537. Graduate Cooperative Education. 1-2 Credits.
The is course is a practical research experience under supervision of an employer that is closely associated with the student’s academic area. A written report which includes a literature survey and research findings and an oral presentation are required. Prerequisite: Approval of the Electrical Engineering Graduate Committee or Electrical Engineering Department Graduate Director, completion of the program of study. Repeatable to 3 credits. S/U grading.

EE 539. Electromagnetic Compatibility. 3 Credits.
Introduction to design considerations and techniques used to ensure electromagnetic compatibility. Prerequisite: EE 409 or consent of instructor.

EE 540. Computer Networks Communications. 3 Credits.
Computer Communications is an undergraduate/graduate course that introduces fundamental concepts in the design and implementation of computer communication networks and their protocols. Prerequisite: Consent of the instructor. On demand.

EE 542. Network Architectures. 3 Credits.
Several network architectures are used today for transporting data and providing a good network service and performance. This course explains the fundamental network architecture concepts and their communications protocols. Prerequisite: Consent of the instructor. On demand.

EE 544. Advanced Microwave Engineering. 3 Credits.
Analysis of passive microwave components including power dividers, resonators, filters, ferromagnetic and MEMs components. On demand. Prerequisites: EE 409 and EE 434, or consent of instructor. On demand.

EE 545. Introduction to Biomedical Engineering. 3 Credits.
This course introduces biomedical engineering and several systems of the human physiology. Signals of biological origin obtained from these systems, biosensors, transducers and bioelectrodes used to acquire such signals, along with medical quality amplifiers for measuring biopotentials, are discussed. Prerequisite: EE 314, EE 421 or consent of instructor.

EE 546. Biomedical Signal Processing. 3 Credits.
This course presents the several fundamental of digital signal processing methods applied to biomedical signals. Topics include data acquisition and related issues, filtering, feature extraction, classification, and decision making. The course is based on a series of labs and experiments of applying different methods to real biomedical signals. Lectures cover signal processing topics relevant to the lab exercises. Prerequisite: Consent of the instructor. On demand.

EE 547. Deep Learning Applications in Biomedical Engineering. 3 Credits.
Applications of different machine learning techniques to biomedical image and signal processing are evaluated. Prerequisite: EE 314 or the consent of the instructor. On demand.

EE 550. Biomedical Instrumentation. 3 Credits.
Introduction to circuits and systems that allow electrical technology to interface with biological systems. Prerequisite: EE 314, EE 316 and EE 421, or consent of instructor.

EE 551. Cryptography Techniques and their VLSI Implementations. 3 Credits.
Modern cryptography algorithms are necessary for protecting data storage and communication streams from disclosure and manipulation of information by hackers. This course exposes students to the standard cryptography algorithms and their implementation in VLSI chips, Field Programmable Array devices, using VHDL language. Prerequisite: Consent of the instructor. On demand.

EE 552. Advanced Embedded Systems Design. 3 Credits.
This course provides students with cutting-edge techniques in the design and implementation of advanced embedded systems that involve analog/digital conversion, interrupts, timers, CCP modules, and parallel/serial communications. Prerequisite: EE 452 or consent of instructor.

EE 560. Engineering Computation. 3 Credits.
Development and application of optimization techniques in practical problems encountered in electrical engineering, Downhill and probabilistic optimization techniques, Modeling of complex systems by partial differential equations and their numerical solution by finite difference and finite element methods. Prerequisite: Consent of instructor. On demand.

EE 562. Advanced Linear Programming Modeling. 3 Credits.
This course will focus on the solution of large-scale linear optimization problems and systems of linear inequalities. Theoretical topics to be addressed include some fundamental results from convex analysis applied to linear programs, and basic ideas from complexity theory especially the importance of polynomial-time algorithms. Algorithmic topics include extensions to the simplex method, the primal-dual simplex method, interior point algorithms, and decomposition and column-and row-generation methods and Mixed integer programming and network flow topics. Prerequisite: EE 304 or consent of the instructor. On demand.

EE 570. Seminar. 1 Credit.
The purpose of the course is to practice communication skills in writing papers and preparing presentations. Open to qualified advanced undergraduate students and graduates. Repeatable to 3 credits. On demand.

EE 590. Advanced Electrical Engineering Problems. 1-6 Credits.
Credit hours for new graduate courses and special topics in Electrical Engineering. Prerequisites: Open by permission to graduate students and qualified seniors. Repeatable. On demand.

EE 591. Electrical Engineering Research. 1-6 Credits.
Students perform a project under the supervision of a member of the staff. A written report is required. Repeatable for credit. Prerequisites: Admission to one of Electrical Engineering graduate programs and consent of instructor. Repeatable to 9 credits. On demand.

EE 595. Design Project. 3-6 Credits.
A three to six credit course of engineering design experience involving individual effort and a formal written report. Repeatable to 6 credits. Prerequisites: Restricted to Master of Engineering student candidates and subject to approval by the student's advisor. Repeatable to 6 credits.

EE 599. Doctoral Research in Electrical Engineering. 1-15 Credits.
Doctoral Research. Repeatable. F.S,SS.

EE 601. Foundations of Cyber Security. 3 Credits.
This course provides a solid foundation for further study in cyber security. The course incorporates numerous topics that are fundamental to the field beginning with a high-level overview of cyber security and continuing into the topics of calculus and computer programming. These topics are presented utilizing real-world cyber security applications. Prerequisite: Students enrolled/admitted in the MS in Cyber Security program. F.S,SS.

EE 611. Emerging Threats and Defenses. 3 Credits.
Cyber-attacks are a serious economic and security threat. To combat both immediate and future dangers governments are investing in cyber security. Understanding trends in cyber-security and how machine-learning techniques defenses can respond to threats is a critical component of protecting networks, infrastructure and users. This course explores the growing challenges of securing sensitive data, networks to defend against malicious acts. Prerequisite: Consent of the instructor. On demand.

EE 612. Spread Spectrum Communications for Cyber Security. 3 Credits.
This course brings students up-to-date in key concept, underlying principles and practical applications of Spread Spectrum Technology. A course that presents timely information that student can immediately put to use in tackling real world cyber threats. Prerequisite: Consent of the instructor. On demand.

EE 613. Advanced Cyber Security Principles. 3 Credits.
This course is a comprehensive study of the principles and practices of computer system security including operating system security, network security, software security and web security. Topics include common attacking techniques such as virus, trojan, worms and memory exploits; the formalisms of information security such as the access control and information flow theory; the common security policies such as BLP and Biba model; the basic cryptography, RSA, cryptographic hash function, and password system; the real system implementations, with case study of UNIX, SE-Linux, and Windows; network intrusion detection; software security theory; web security; legal and ethical issues in computer security. Prerequisite: Consent of the instructor. On demand.
EE 614. Applied Cryptography. 3 Credits.
Modern cryptography algorithms are necessary for protection of data storage and communication streams from disclosure and manipulation of information to distrusted or malicious parties. This course explains the inner workings of cryptographic primitives and how to implement them. Assignments will be both theoretical and application based. Experience with C/ C++ programming is required. Prerequisite: Consent of the instructor. On demand.

EE 615. Cyber Forecasting. 3 Credits.
There are literally millions of enterprises and organizations that already conduct business on the World Wide Web and millions more that will in the future. Many are not sure on how much to spend to defend themselves against Internet Security attacks and many are afraid to conduct business on the Web because of the lack of security in their infrastructure and information systems. Prerequisite: Consent of the instructor. On demand.

EE 616. Cyber-Physical Energy Systems Security. 3 Credits.
This course discusses the basics of integrated power and communication infrastructures in cyber-physical electrical energy and power systems. In order to understand planning, design and operation of such systems, this course includes both cyber and physical topics related to modern power systems, such as technologies for storing and generating electric power (including renewable energy), layering, networking, packets routing, coding, cellular networks, WLAN, and sensors. Approaches for an integrated operation, management and control of such systems, as well as the application of signal processing techniques in electric power grids are also explored in this course. Implication of such integrated power and communications cyber-physical systems in terms of sustainability, security, resiliency, and reliability will also be reviewed. Prerequisites: EE 313 and EE 423 or consent of the instructor. On demand.

EE 617. Data Operations and Security. 3 Credits.
This course explains the key concepts used in database systems and demonstrates the features of a Database management software. The course will discuss the different types of commercial database systems and will explain the concepts used to design a database. Also this course will teach how to implement a database using the relational DBMS. The course also illustrates the usage of database management systems. The course will also discuss database attacks, ACID properties. Prerequisite: Consent of the instructor. On demand.

EE 623. Introduction to Smart Grid I. 3 Credits.
This course is an in-depth study of the ways in which information and communication technologies (ICT) are being deployed to modernize the electric energy infrastructure, i.e. "Smart Grid." In this course we will define Smart Grid as the use of ICT (in combination with power electronics and policy) to make electricity cleaner, less costly, and more reliable. Prerequisite: EE 313 or graduate student standing. On demand.

EE 624. Introduction to Smart Grid II. 3 Credits.
This is the next sequel of smartgrid course is an in-depth study of the ways in which information and communication technologies (ICT) are being deployed to modernize the electric energy infrastructure, i.e. "Smart Grid." In this course we will define Smart Grid as the use of ICT (in combination with power electronics and policy) to make electricity cleaner, less costly, and more reliable. Prerequisite: EE 623. On demand.

EE 640. Communication Protocols: OSI model and TCP/IP Protocol Stack. 3 Credits.
Communication between computers and networks uses protocols. This course introduces students to the OSI model and TCP/IP protocol stack. Functions of each layer in the network are explained and their security analyzed. Prerequisite: Consent of the instructor. On demand.

EE 740. Intrusion Detection Algorithms. 3 Credits.
With the increasing number of cyber-attacks, intrusion detection systems become crucial tools for detecting anomalies and enhancing computers and networks security. This course exposes students to the existing intrusion detection techniques and algorithms, including signature-based and anomaly-based approaches. Prerequisite: Consent of the instructor. On demand.

EE 748. Internet of Things. 3 Credits.
The Internet of Things course will examine the security and ethical issues of the vast implementation of smart devices known as the Internet of Things (IoT). The IoT is an environment where smart devices sense, anticipate, and respond to our needs as we manage them remotely. These smart devices often act as the gateway between our digital and physical world. The IoT touches many aspects of life including transportation, health care, safety, environment, energy, and more. This course will examine and discuss IoT technology and market specific topics, relevant case studies of IoT security vulnerabilities and attacks, and mitigation controls. Students will assess the health, safety, privacy, and economic impacts of IoT security events. Prerequisite: Consent of the instructor. On demand.

EE 750. Internet of Things and Security. 3 Credits.
Internet of Things (IoT) is an emerging field where computing devices are interconnected through the existing internet infrastructure. The IoT has changed the world with new innovative products such as autonomous vehicles, smart home, and smart wearables devices. This course explains the concept of IoT, its applications, networks and communication architectures, and security threats. Prerequisite: Consent of the instructor. On demand.

EE 751. Wireless Sensor Networks. 3 Credits.
This class provides a hands-on introduction to wireless sensor networking. We will start with a discussion of the WSN+ubiquitous computing vision and applications, and also discuss emergent/swarm behavior in distributed and networked systems. We will provide a tutorial on programming wireless sensor network applications in Tinyos. Finally, we will quickly cover protocols for MAC layer, Link layer, Routing, Querying, and Tracking. Prerequisite: Consent of the instructor. On demand.

EE 752. Introduction to Autonomous Systems. 3 Credits.
Advanced topics in autonomous and intelligent mobile robots, with emphasis on planning algorithms and cooperative control. Robot kinematics, path and motion planning, formation strategies, cooperative rules and behaviors. The application of cooperative control spans from natural phenomena of groupings such as fish schools, bird flocks, deer herds, to engineering systems such as mobile sensing networks, vehicle platoon. Prerequisite: Consent of the instructor. On demand.

EE 994. Capstone. 3 Credits.
This course is intended for students enrolled in a graduate program, who need to complete a semester long project. The class will emphasize applied learning to demonstrate real world problem solving skills. F,S,SS.

EE 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

EE 997. Independent Study. 3 Credits.
This course is independent study for MS Non-Thesis Students. Prerequisite: Consent of Advisor.

EE 998. Thesis. 1-6 Credits.
Repeatable to 9 credits.

EE 999. Dissertation in Electrical Engineering. 1-18 Credits.
Dissertation for Ph.D. EE students. Repeatable to 18 credits. F,S,SS.

Undergraduate Courses for Graduate Credit

EE 411. Communications Engineering. 3 Credits.
Mathematical definition of random and deterministic signals and a study of various modulation systems. Prerequisite: EE 314. On demand.

EE 423. Power Systems I. 3 Credits.
Electric power systems operation, control and economic analysis. Prerequisite: EE 313. On demand.

EE 428. Robotics Fundamentals. 3 Credits.
Fundamentals of robotic systems: modeling, analysis, design, planning, and control. The project provides hands-on experience with robotic systems. Prerequisite: MATH 266 or consent of instructor. On demand.

EE 430. Introduction to Antenna Engineering. 3 Credits.
Review of vector analysis and Maxwell's equations, wave propagation in unbounded regions, reflection and refraction of waves, fundamental antenna concepts, wire and aperture type antennas, wave and antenna polarization, antenna measurements, and computer-aided analysis. Prerequisite: EE 409 or consent of instructor. On demand.
EE 434. Microwave Engineering. 3 Credits.
Review of transmission lines and plane waves, analysis of microwave networks and components using scattering matrices, analysis of periodic structures, transmission and cavity type filters, high frequency effects, microwave oscillators, amplifiers, and microwave measurement techniques. Prerequisite: EE 409 or consent of instructor. On demand.

EE 451. Computer Hardware Organization. 3 Credits.
The study of complete computer systems including digital hardware interconnection and organization and various operation and control methods necessary for realizing digital computers and analog systems. Prerequisite: EE 201 and EE 304; or consent of instructor. On demand.

EE 456. Digital Image Processing. 3 Credits.
Digital image retrieval, modification, enhancement, restoration, and storage. Image transformation and computer vision. The associated laboratory provides hands-on experiences. Prerequisite: EE 304 and EE 314. On demand.

Combined B.S./M.S. or B.S./M.Eng. Degrees in Electrical Engineering

Admission Requirements for B.S./M.S. or B.S./M.Eng. Degree
1. Students may apply for this program upon completion of 95 credits toward the bachelor's degree.
2. An overall undergraduate GPA of 3.0 at the time of admission.
3. Satisfy the School of Graduate Studies' English Language Proficiency requirements as published in the graduate catalog.
4. Students who have received a bachelor's degree or higher from the United States or English-speaking Canada are not required to submit the TOEFL.

Degree Requirements for B.S./M.S. or B.S./M.Eng. Degree
Students seeking the Master of Science or Master of Engineering degree through the Combined Degree program at the University of North Dakota must satisfy all requirements for both the B.S. and M.S. degree. A maximum of six credits of prior approved coursework can get double counted toward each of the two degrees. Double counted courses may not include required courses for the B.S.E.E. degree, but may include technical or electrical engineering elective coursework, preferably at the 500-level or above.

Degree requirements for the M.S. or M.Eng. degree will be those listed by the School of Graduate Studies as found in the graduate school catalog.

Doctor of Philosophy in Electrical Engineering

Admission Requirements
1. A baccalaureate degree in Electrical or closely related engineering disciplines with a GPA of 3.3 or higher or a Master of Science degree in an engineering discipline with a GPA of 3.0.
2. Satisfy the Graduate School's English Language Proficiency requirements as published in the Academic Catalog.
3. In addition to meeting the general provisions in the UND Academic Catalog and the minimum requirements in items 1-2 above, candidates are assessed using a holistic process that considers Student's Record of Publications, transcripts of previous college work, relevant research and work experience, letters of recommendation, research interests, and English language skills. Applicant applying with BS degrees from non-ABET accredited programs/universities are strongly recommended to submit scores from the General Test of Graduate Record Examination.
4. Students admitted to an M.S.E.E. program but meeting the minimum requirements in items 1-2 above, may continue after one calendar year, and upon the recommendation of his/her advisory committee, request to by-pass the master's degree and work directly toward the Ph.D. degree in Electrical Engineering. The recommendation of the advisory committee shall be brought to a vote by the Electrical Engineering graduate committee. A minimum of one week before such a meeting, the graduate committee shall be notified and provided with the student’s updated file which shall consist of the materials used for application into the M.S.E.E. program, a transcript of all academic work completed at UND, and any additional materials the student wishes to have considered. If the recommendation is approved by the relevant graduate committee, the student will be given the qualifying exam. Passing this exam will advance the student to Approved Status in the Doctoral Program in Electrical Engineering.

Residence Requirements
The Ph.D. program in Electrical Engineering provides an opportunity for sustained and concentrated intellectual efforts. In both campus and distance delivery modes, the Electrical Engineering faculty advisor and advisory committee members must maintain regular interactions with Ph.D. student. For campus delivery mode, the student is required to have residency of at least two consecutive semesters. During residency, the student must be registered for at least nine credits in a semester, or be a graduate research or teaching assistant taking the appropriate credits to qualify as a full-time student. As an alternative, students utilizing the distance delivery program can meet the residency requirement by demonstrating their research activities are coordinated with their advisor and advisory committee and are being performed in an environment that provides meaningful intellectual interactions on a regular basis. This may be provided through their place of employment, through interactions with a national lab or other recognized research facility/university, by interfacing with a private of public industry, hospital, or other similar venue. The student will be responsible for including the nature of their interactions as a part of their research plan for approval as meeting residency requirements. For distance delivery mode, the student must have a minimum three campus visits and provide a presentation during each visit. One of these presentations can be the oral section (Section III) of the qualifying examination. Additionally, a Ph.D. candidate must be physically present on campus for the Ph.D. dissertation defense.

Degree Requirements
Students seeking the Doctor of Philosophy degree at the University of North Dakota must satisfy all general requirements set forth by the Graduate School as well as particular requirements set forth by the Electrical Engineering Doctoral Program.

The following requirements are in addition to the UND graduate school general requirements for the Ph.D.:
1. Completion of 90 semester credits beyond the baccalaureate degree
2. Maintenance of at least a 3.0 GPA for all classes completed as a graduate student.
3. Scholarly Tools: Proficiency in mathematics demonstrated by completing nine approved credits of mathematics intensive coursework (equivalent to UND 400-level or higher courses) with a grade of B or better which must include at least one course in numerical analysis. Scholarly tools courses taken for graduate credit after a student has enrolled in a graduate program at UND may be counted to fulfill requirements listed in Item 4 below.
4. A maximum of 30 credit hours can be transferred from a master's program.
5. A minimum of 30 credit hours must be doctoral research and dissertation.
6. Exactly 3 credit hours of the EE 570-Graduate Seminar must be taken.
7. Maximum of 9 credit hours of EE 591 Electrical Engineering Research is acceptable.
8. A minimum of 39 credit hours of coursework is required (up to 21 credit hours of coursework may be transferred from a master's program in fulfilling this requirement subject to the credit transfer limits described in the general section of this Academic Catalog). The coursework shall include a minimum of 27 credit hours of Electrical Engineering (or relevance courses with the consent of advisor) coursework selected from the approved list of
courses. Equivalent graduate level coursework may be transferred from a master’s program.

9. Successful completion of a qualifying examination, taken no earlier than the end of their first year in residence and no later than the end of their second year of residence. The qualifying examination includes the following three sections.

Section I
It will cover four general topics of Electrical Engineering. Selection of the four topics for this examination shall require the approval of the candidate’s faculty advisor and the Graduate Director. Three results for each of the four sections of the examination can be obtained: 1) pass; 2) provisional pass; and 3) fail. Candidates obtaining a result of “provisional pass” for any section of the exam will be required to remediate the topical area in which the provisional pass was received in accordance to stipulations specified by the examiner, with approval of the Graduate Director. Candidates who fail one or more sections of the exam will be allowed one opportunity to repeat that section of the exam. The reexamination must take place no later than 13 months after the initial examination attempt. A direct admit student who fails an exam a second time may request to be reclassified as a master’s student and complete a M.S.E.E. or M.Eng. in EE, and then reapply to the Doctoral program.

Section II
A detailed written doctoral research proposal must be submitted to the committee. The proposal should cover:

a. a literature review of the relevant field of research related to the project
b. proposed methods
c. preliminary results (simulation or experiment)
d. the objectives of the proposed project, and
e. tasks and the timeline of the proposed research.

The report is typically 30-50 pages. The report should be reviewed and approved by the student advisor. Then, at least three weeks prior to the next step, the report should be distributed to the student committee members for their review and grading.

Each of the five (a-e) components will be evaluated and graded on a scale of 0 to 20. To pass the written exam, the student should earn a minimum of 16/20 in each category. All grades from student committee members will be averaged to determine a grade in each category.

If the report earns a passing grade, a date can be scheduled for an oral presentation (i.e., Section III). If failed, the student has the opportunity to revise and resubmit the report to the committee for re-evaluation.

Section III
An oral component of the comprehensive examination must be presented in person to the committee on the research topics described in the above section (II-a to II-e). Three results for the oral component can be obtained: 1) pass; 2) provisional pass; and 3) fail. Candidates obtaining a result of “provisional pass” will be allowed to Advance to Candidacy status after completion of stipulations specified by the examining committee plus obtaining a passing result on a retest for the portion of the exam covered by the stipulations. Candidates who fail the exam will be allowed one opportunity to repeat the exam in less than 6 months as specified by the student committee. A student who fails an exam a second time may request to be reclassified as a master’s student and complete a Master of Science in Electrical Engineering degree.

10. Annual oral progress presentations and report forms must be presented/submitted to the committee. A part of these presentations will include details on the dissertation research progress and plan. After successful completion of the written research proposal and oral component of the comprehensive exam, any deviation from the approved research objectives as stated and documented in the research proposal must be approved by the committee.

11. A candidate for the degree must complete the original basic research investigation as documented in the research proposal. Each candidate will complete the research investigation to the satisfaction of the research advisor and the advisory committee and will prepare a written dissertation covering the research. The research must represent an original and independent investigation by the student. It is expected that the results of the research will be submitted for publication in refereed research journals and conferences. The candidate will submit the dissertation to the advisory committee at least four weeks prior to defense date.

12. The candidate must present and successfully defend the dissertation at the final examination (see School of Graduate Studies requirements (https://und.edu/academics/graduate-school)). Four results of the examination can be obtained: 1) pass; 2) minor revision; 3) major revision; and 4) fail. For minor revisions there is no need for another defense session, and, upon revising the dissertation, the advisory committee can pass the student. For major revisions the student is asked to fundamentally revise the methodologies and schedule another defense session. If failed, the student will not be able to obtain a Ph.D. degree and may request to be reclassified as a master’s student and complete a Master of Science in Electrical Engineering degree.

13. At least two peer reviewed ISI (Institute for Scientific Information) journals (as the first author) and two peer reviewed conference papers (as the first author), submitted with the consent of advisor, must be published or accepted.

Master of Engineering in Electrical Engineering

Admission Requirements
The applicant must meet the School of Graduate Studies' current minimum general admission requirements as published in the graduate catalog.

1. Bachelor of Science degree in Electrical Engineering or closely related field. Students holding B.S. degrees in other fields, e.g., physics, mathematics, and computer science, may be admitted to Provisional or Qualified status until undergraduate requirements in electrical engineering have been satisfied.
2. An overall undergraduate GPA of at least 2.5 or a GPA of at least 2.75 for the last two years.
3. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

Degree Requirements
1. A program of study must include the following:
   a. A minimum of 30 semester credit hours
   b. Three to Six (3-6) semester credit hours of an approved design project (EE 595 Design Project)
   c. Maximum of three (3) credit hours of EE 591 Electrical Engineering Research is acceptable.
   d. Minimum of fifteen (15) semester credit hours of coursework at the 500 level or above (including the design project)
   e. All courses must be approved for graduate credit and by the advisor.
2. An overall GPA of 3.0 or better for all coursework.

Master of Science in Cyber Security

This program (https://onlinedegrees.und.edu/ipap-mscs/?Access_Code=UND-MSCS-SEC2&utm_campaign=UND-MSCS-SEC02) prepares students who have a strong interest related to the field of cyber security. All of the general requirements for enrollment, participation, and completion of a degree documented in the catalog of the University of North Dakota as appropriate shall be required. Specific requirements over and above the general catalog requirements are as follows:

Admission Requirements

1. A bachelor's degree, graduate degree or equivalent from an accredited institution.
2. A minimum G.P.A. of 2.75 (4.0 scale) is required. Provisional admittance may be obtained for G.P.A.s less than 2.75. This will be determined on a case-by-case basis.

Students will have the option to choose an all course based M.S. program (30 credits) or an M.S. program with a thesis component, in which 6 credits out of the 30 credits will be thesis.

Degree Requirements (30 Credits)

Non-thesis

1. Selected Required courses (18 credits required for all students)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 601</td>
<td>Foundations of Cyber Security</td>
<td>3</td>
</tr>
<tr>
<td>EE 611</td>
<td>Emerging Threats and Defenses</td>
<td>3</td>
</tr>
<tr>
<td>EE 614</td>
<td>Applied Cryptography</td>
<td>3</td>
</tr>
<tr>
<td>EE 640</td>
<td>Communication Protocols: OSI model and TCP/IP Protocol Stack</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 565</td>
<td>Advanced Software Engineering</td>
<td>3</td>
</tr>
<tr>
<td>EE 994</td>
<td>Capstone</td>
<td>3</td>
</tr>
</tbody>
</table>

2. Tracks: Requirements in addition to the Required Courses in #1

A. General

Required Track courses: Any 12 credits from the program course list.

B. Autonomous Systems Cyber Security

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 552</td>
<td>Advanced Embedded Systems Design</td>
<td></td>
</tr>
<tr>
<td>EE 752</td>
<td>Introduction to Autonomous Systems</td>
<td></td>
</tr>
<tr>
<td>EE 526</td>
<td>Engineering Systems Reliability</td>
<td></td>
</tr>
</tbody>
</table>

Electives: 3 credits from the program course list*

C. Data Security

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSCI 427</td>
<td>Cloud Computing</td>
<td></td>
</tr>
<tr>
<td>EE 740</td>
<td>Intrusion Detection Algorithms</td>
<td></td>
</tr>
<tr>
<td>CSCI 455</td>
<td>Database Management Systems</td>
<td></td>
</tr>
</tbody>
</table>

Electives: 3 credits from the program course list*

D. Cyber Security and Behavior

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYC 522</td>
<td>Human Factors in Cyber Security</td>
<td></td>
</tr>
<tr>
<td>PSYC 525</td>
<td>Insider Threat Analysis</td>
<td></td>
</tr>
<tr>
<td>PSYC 539</td>
<td>Cognitive Psychology</td>
<td></td>
</tr>
</tbody>
</table>

Electives: 3 credits from the program course list*

3. Free Electives

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 623</td>
<td>Introduction to Smart Grid I</td>
<td></td>
</tr>
<tr>
<td>EE 750</td>
<td>Internet of Things and Security</td>
<td></td>
</tr>
<tr>
<td>EE 537</td>
<td>Graduate Cooperative Education</td>
<td></td>
</tr>
</tbody>
</table>

*Any “Track” course outside of one’s selected track can count as an elective

Program Course List:

<table>
<thead>
<tr>
<th>Course</th>
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<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 526</td>
<td>Engineering Systems Reliability</td>
<td></td>
</tr>
<tr>
<td>EE 552</td>
<td>Advanced Embedded Systems Design</td>
<td></td>
</tr>
<tr>
<td>EE 611</td>
<td>Emerging Threats and Defenses</td>
<td></td>
</tr>
<tr>
<td>EE 614</td>
<td>Applied Cryptography</td>
<td></td>
</tr>
<tr>
<td>EE 623</td>
<td>Introduction to Smart Grid I</td>
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</tr>
<tr>
<td>EE 640</td>
<td>Communication Protocols: OSI model and TCP/IP Protocol Stack</td>
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<td>EE 740</td>
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<tr>
<td>EE 750</td>
<td>Internet of Things and Security</td>
<td></td>
</tr>
<tr>
<td>CSCI 427</td>
<td>Cloud Computing</td>
<td></td>
</tr>
<tr>
<td>CSCI 513</td>
<td>Advanced Database Systems</td>
<td></td>
</tr>
<tr>
<td>CSCI 565</td>
<td>Advanced Software Engineering</td>
<td></td>
</tr>
<tr>
<td>PSYC 522</td>
<td>Human Factors in Cyber Security</td>
<td></td>
</tr>
<tr>
<td>PSYC 525</td>
<td>Insider Threat Analysis</td>
<td></td>
</tr>
</tbody>
</table>

PSYC 539 | Cognitive Psychology | 3
EE 595 | Design Project | must be cyber security | 3
EE 537 | Graduate Cooperative Education | must be cyber security | 3
EE 612 | Spread Spectrum Communications for Cyber Security | 3
EE 616 | Cyber-Physical Energy Systems Security | 3
EE 551 | Cryptography Techniques and their VLSI Implementations | 3
EE 624 | Introduction to Smart Grid I | 3
EE 540 | Computer Networks Communications | 3
EE 534 | Advanced Wireless Communications Engineering | 3
EE 508 | Intelligent Decision Systems | 3
EE 542 | Network Architectures | 3
EE 617 | Data Operations and Security | 3
EE 613 | Advanced Cyber Security Principles | 3
EE 751 | Wireless Sensor Networks | 3
EE 615 | Cyber Forecasting | 3
EE 570 | Seminar | 1
MATH 425 | Cryptological Mathematics | 3
CSCI 487 | Penetration Testing | 3
CSCI 551 | Security for Cloud Computing | 3
CSCI 552 | Cyber Physical Systems Security | 3

Thesis

Required: (30 credits from the following list, with advisor consent, 6 credits will be thesis). Graduate Cooperative Education (EE 357) must be cyber security based industrial or external research lab.

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<tr>
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</thead>
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<td>Emerging Threats and Defenses</td>
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<td>EE 612</td>
<td>Spread Spectrum Communications for Cyber Security</td>
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</tr>
<tr>
<td>EE 616</td>
<td>Cyber-Physical Energy Systems Security</td>
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<tr>
<td>EE 551</td>
<td>Cryptography Techniques and their VLSI Implementations</td>
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</tr>
<tr>
<td>EE 623</td>
<td>Introduction to Smart Grid I</td>
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</tr>
<tr>
<td>EE 624</td>
<td>Introduction to Smart Grid II</td>
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<td>EE 526</td>
<td>Engineering Systems Reliability</td>
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<td>Computer Networks Communications</td>
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<tr>
<td>CSCI 552</td>
<td>Cyber Physical Systems Security</td>
<td></td>
</tr>
</tbody>
</table>
Master of Science in Electrical Engineering

Admission Requirements
The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. Bachelor of Science degree in Electrical Engineering or closely related field. Students holding B.S. degrees in other fields, e.g., physics, mathematics, and computer science, may be admitted to Provisional or Qualified status until selected undergraduate requirements in electrical engineering have been satisfied.
2. An overall undergraduate GPA of at least 2.75 or a GPA of at least 3.00 for the last two years.
3. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the catalog. Applicant holding degrees from non-ABET accredited programs/universities are strongly recommended to submit scores from the General Test of Graduate Record Examination.

Degree Requirements
Thesis Option:

1. A minimum of 30 semester credits, including credits granted for the thesis.
2. A minimum of 21 semester credits, including thesis credits, must be in the major field of electrical engineering.
3. A minor field of study can be obtained by completing 9 semester credits from another department that offers a graduate program. A graduate faculty member from that department must serve on the thesis committee of the student.
4. A cognate can be obtained by completing 9 semester credits from more than one department outside of electrical engineering, or from a single department that does not offer a graduate program.
5. At least one-half of the coursework credits must be at or above the 500-level.
6. A maximum of 9 semester credits of the credit hours required for the degree may be transferred from another institution.
7. A maximum of 6 credit hours of EE 591 Electrical Engineering Research is acceptable.
8. Completion of a research project, submission of a thesis report, and a thesis defense.
9. An overall GPA of 3.00 or better in all coursework.
10. The thesis course (EE 998) can be between 6-9 credits with approval of the thesis committee.
11. One credit of seminar class (EE 570) is mandatory for each MS student.
12. At least two peer-reviewed conference, journal, or patent applications (as the first author) submitted with the consent of student’s advisor, must be accepted or published before the time of defense.

Non-Thesis Option:

1. Completion of at least 30 semester credits, including credits required for the major.
2. 3 credit hour EE 997 Independent Study (requires a written report approved by the faculty advisor) is acceptable.
3. At least 15 coursework credits must be at or above the 500-level.
4. A maximum of 9 semester credits of the credit hours required for the degree may be transferred from another institution.
5. A maximum of 3 credit hours of EE 591 Electrical Engineering Research is acceptable.
6. An overall GPA of 3.00 or better in all coursework.
7. Student has to successfully complete a comprehensive final examination on three general areas approved by the candidate’s faculty advisor.
8. At least one peer-reviewed conference, journal, or patent application (as the first author) must be submitted with the consent of student's advisor.

Energy Systems Engineering

M.S. in Energy Systems Engineering (p. 450)
M.Engr. in Energy Systems Engineering (p. 450)
Ph.D. in Energy Engineering (p. 449)

Courses

SEE 510. Process Design & Feasibility Assessment of Sustainable Technologies. 3 Credits.
The research-to-commercialization life cycle and evaluation methods are examined in depth using sustainable energy technologies as specific case studies.

SEE 590. Special Topics in Sustainable Energy Engineering. 1-6 Credits.
Investigations of special topics in sustainable energy engineering dictated by students and faculty interests. Repeatable. Prerequisite: Consent of instructor. Repeatable.

Doctor of Philosophy in Energy Engineering

Admission Requirements
The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog. Additional requirements include:

1. B.S. degree in an engineering discipline from an ABET accredited program with a GPA of at least 3.0 or a M.S. degree in an engineering discipline with a GPA of at least 3.0. Students holding a B.S. degree in a science or other engineering-related field may be admitted to Qualified Status with an obligation to acquire background undergraduate engineering knowledge.

Degree Requirements

Students seeking the Doctor of Philosophy degree at the University of North Dakota must satisfy all general requirements set forth by the Graduate School. The following requirements are in addition to the UND graduate school general requirements for the Ph.D.:

1. A minimum of 90 semester credits, including acceptable master's degree work and credits granted for the dissertation and the research leading to the dissertation. These 90 credits should include:
   • 30 to 48 semester credits of coursework taken from the approved list published by the Energy Engineering program. Other courses may be accepted with approval of the student’s faculty advisor and the graduate director.
   • 30 to 48 semester credits of research.
   • 12 credits of dissertation.
2. Successful completion of an oral comprehensive exam when at least 45 post baccalaureate credits have been completed. This exam will be based on core courses taken for this degree and their application to the student’s research. The exam will be administered by at least three graduate faculty members from the Institute for Energy Studies and its Faculty Affiliates. Candidates who fail the exam will be allowed one opportunity to repeat the exam. The reexamination must take place no later than 13 months after the initial exam attempt.
3. Students must present to their advisory committee an annual oral progress report describing research progress.
4. Preparation and defense of a dissertation documenting original and independent research on a topic related to energy engineering.
5. Scholarly Tools: Engineering and mathematics courses required to fulfill the requirements for those students admitted under Qualified Status. Scholarly tools courses taken for graduate credit after a student
Master of Engineering in Energy Systems Engineering

Admission Requirements
The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. B.S. degree in an engineering or related field. Students holding a B.S. degree in a science or other related field may be admitted to Qualified Status with an obligation to acquire a background engineering knowledge. The exact requirements will be determined on a case-by-case basis.
2. An overall undergraduate GPA of at least 2.50, or 3.00 for the last two years.
3. Graduate Record Examination General Test for those with undergraduate degrees from non-ABET accredited programs.
4. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

Degree Requirements
1. A minimum of 30 credits of coursework selected in collaboration with the student’s advisor and approved by the program’s graduate director.
2. At least one-half of the credits must be at or above the 500-level.
3. A maximum of nine semester credits may be transferred from another institution.
4. A minimum of 24 credits of coursework selected in collaboration with the student’s advisor and approved by the program’s graduate director.
5. Preparation of a written independent study report approved by the faculty advisor
6. A formal defense of the student’s independent study.

Environmental Engineering

M.S. in Environmental Engineering (p. 451)
M.Engr. in Environmental Engineering (p. 451)
Ph.D. in Environmental Engineering (p. 451)
Certificate in Environmental Engineering (p. 450)

Courses
ENVE 562. Seminar in Environmental Engineering. 1 Credit.
Conferences, seminars, and reports on current developments in environmental engineering. Students will participate in professional presentations on topics relevant to environmental engineering. Students will also report the results of their graduate research or present information on other technically relevant topics approved by the course instructor. Repeatable.
ENVE 590. Special Topics in Environmental Engineering. 1-3 Credits.
Topics of current interest. Repeatable. Repeatable.
ENVE 591. Environmental Engineering Research. 1-6 Credits.
Supervised research work in environmental engineering. Repeatable to 24 credits. Repeatable to 24 credits.
ENVE 595. Design Project. 3-6 Credits.
Engineering design experience involving individual effort and formal written report and presentation.
ENVE 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.
ENVE 998. Thesis. 1-9 Credits.
Preparation of a written independent study report approved by the faculty advisor
Certificate in Environmental Engineering

Admission Requirements
The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. Bachelor of Science degree in an ABET accredited engineering program in Environmental, Chemical, Civil, or Geological Engineering.
2. Students holding a B.S. degree in other engineering disciplines or in a science field with an appropriate background in chemistry, fluid mechanics, and mathematics may also be admitted.
3. An overall undergraduate GPA of at least 2.50 or 3.00 for the last two years.

The courses taken in a previously completed Environmental Engineering Certificate Program may be applied to a Master’s degree in Engineering.

Certificate Requirements
1. A total of nine (9) credit hours must be completed in Gradate level courses listed as Environmental Engineering, Chemical Engineering, Civil Engineering, Geology, or Geological Engineering, and identified as qualified courses for the certificate.
2. A minimum GPA of 3.00 is required to earn the certificate.
Courses shall only count as credit toward fulfilling the requirements listed above when a grade of C or greater has been awarded at the completion of the course.

Doctor of Philosophy in Environmental Engineering

Admission Requirements

The applicant must meet the School of Graduate Studies' current minimum general admission requirements as published in the graduate catalog.

Additional requirements include:

1. A minimum of 90 semester credits, including acceptable master's degree work and credits granted for the dissertation and the research leading to the dissertation. These 90 credits should include:
   - 30 to 48 semester credits of coursework taken from the approved list published by the Environmental Engineering program. Other courses may be accepted with approval of the student's faculty advisor and the graduate director.
   - 12 credits of dissertation.
2. Successful completion of an oral comprehensive exam when at least 45 post baccalaureate credits have been completed. This exam will be based on core courses taken for this degree and their application to the student's research. The exam will be administered by at least three graduate faculty members from the Institute for Environmental Studies and its Faculty Affiliates. Candidates who fail the exam will be allowed one opportunity to repeat the exam. The reexamination must take place no later than 13 months after the initial exam attempt.
3. Students must present to their advisory committee an annual oral progress report describing research progress.
4. Preparation and defense of a dissertation documenting original and independent research on a topic related to environmental engineering.
5. Scholarly Tools: Engineering and mathematics courses required to fulfill the requirements for those students admitted under Qualified Status. Scholarly tools courses taken for graduate credit after a student has enrolled in a graduate program at UND may be counted to fulfill requirements listed in Item 1.
6. There is no residency requirement for this program.

Degree Requirements

Students seeking the Doctor of Philosophy degree at the University of North Dakota must satisfy all general requirements set forth by the Graduate School. The following requirements are in addition to the UND graduate school general requirements for the Ph.D.:

1. A minimum of 30 credits of coursework selected in collaboration with the student’s advisor and approved by the program’s graduate director.
2. At least one-half of the credits must be at or above the 500-level.
3. A maximum of eight semester credits may be transferred from another institution.

Master of Science in Environmental Engineering

Admission Requirements

The applicant must meet the School of Graduate Studies' current minimum general admission requirements as published in the graduate catalog.

Additional requirements include:

1. A Bachelor of Science degree from an engineering program in Environmental, Chemical, Civil, or Geological Engineering. Students holding a B.S. degree in other engineering disciplines or in a science field may be admitted to Qualified Status with an obligation to acquire background undergraduate engineering knowledge. The exact requirements will be determined on a case-by-case basis.
2. An overall undergraduate GPA of at least 2.50, or 3.00 for the last two years.
3. Graduate Record Examination General Test for applicants from non-ABET accredited programs.
4. Satisfy the School of Graduate Studies' English Language Proficiency requirements as published in the graduate catalog.

Degree Requirements

Students seeking the Master of Science degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies’ as well as particular requirements set forth by the Environmental Engineering Program.

1. A minimum of 32 semester credits, including the credits granted for the thesis.
2. At least one-half of the credits must be at or above the 500-level.
3. A thesis documenting research on a topic related to environmental engineering.
4. A formal defense of the student's research.

Non-Thesis Option

Students seeking the Master of Science degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies’ as well as particular requirements set forth by the Environmental Engineering Program.

1. A minimum of 32 semester credits, including the credits granted for the independent study project.
2. At least one-half of the credits must be at or above the 500-level.
3. A maximum of eight semester credits may be transferred from another institution.
4. A minimum of 24 credits of coursework selected in collaboration with the student’s advisor and approved by the program’s graduate director.
5. Preparation of a written independent study report approved by the faculty advisor.
6. A formal defense of the student’s independent study.

**Mechanical Engineering**

M.S. in Mechanical Engineering (p. 455)

M.Engr. in Mechanical Engineering (p. 455)

Ph.D. in Mechanical Engineering (p. 453)

M.Engr. in Unmanned Aircraft Systems Engineering (p. 455)

M.S. in Unmanned Aircraft Systems Engineering (p. 456)

Graduate Certificate in Unmanned Aircraft Systems Engineering (p. 454)

**Courses**

**ME 514. High Temperature Materials. 3 Credits.**
Course Objectives: The objective of this course is to provide students with their first in-depth exposure to high temperature materials, with a primary focus on ceramics and ceramics matrix composites. This course covers the fundamentals of mechanics and microstructure of structural materials for different high-temperature applications. The main emphasis during this course will be ceramic based materials. In addition, other high temperature materials like superalloys, Carbon, and their composites will also be covered. During this course, fundamental topics like bonding, structure, defects, sintering and grain growth, oxidation, and phase equilibria will be covered in detail. In addition, students will also get exposure to the mechanisms of time-dependent deformation, failure mechanism at high temperature, and thermal properties. Finally, different materials used at high temperature (metals, ceramics and their composites) will be reviewed. The successful completion of this course will prepare students for interdisciplinary problem solving and development of high temperature materials from both industrial and research context. Prerequisite: ME 301. S, even years.

**ME 523. Advanced Machine Design. 3 Credits.**
Advanced design and analysis of machine components; kinematic synthesis and analysis of mechanisms, force analysis, rotor dynamics, gyro dynamics, stresses in thick cylinders and flywheels, lubrication, statistical considerations, energy methods, curved beams. Prerequisites: ME 322 and ME 323.

**ME 524. Deformation and Fracture. 3 Credits.**
Aspects of elasticity theory, continuum mechanics and fracture mechanics. Fundamental relationships between material structure and engineering properties. Principles and properties of composite materials. Prerequisite: ME 301 or consent of instructor.

**ME 525. Metal Fatigue in Engineering. 3 Credits.**
Metal fatigue in engineering, involving design, development, and failure analysis of components, structures, machines, and vehicles subjected to repeated loading. Prerequisite: ENGR 203 and ME 301, or consent of instructor.

**ME 526. Advanced Vibrations. 3 Credits.**
Advanced vibration theory including the solutions of multi-degree of freedom coupled systems, continuous systems, energy methods, and non-linear vibrations. Prerequisite: ME 426.

**ME 529. Advanced Finite Element Methods. 3 Credits.**
Computer-aided techniques for finite element analysis of engineering systems. Topics include solution algorithm for nonlinear methods, large deflection, inelastic and contact analysis, and analysis of vibrating systems. Prerequisite: ME 429 or consent of instructor.

**ME 532. Advanced Dynamics. 3 Credits.**
Kinematics and kinetics of plane and three-dimensional motion, vector mechanics, general methods of linear and angular momentum, generalized coordinates, and variational methods including Hamilton’s and Lagrange’s equations. Prerequisites: ENGR 202 and MATH 266.

**ME 542. Thermodynamics of Materials. 3 Credits.**
Foundations of materials behavior in terms of energy and statistics. Topics will include entropy, free energy, phase equilibrium, ideal versus real solutions and diffusion. Prerequisites: ME 301 and ME 341, or consent of instructor.

**ME 545. Fluidized-Bed Combustion Engineering. 3 Credits.**
Fluidized-bed hydraulics and heat transfer. Design of fluidized-bed coal combustors. Combustion models and their significance. Prerequisite: ME 306 and ME 474, or consent of instructor.

**ME 550. Introduction to Autonomous Robotics. 3 Credits.**
An introduction to autonomous mobile robots including hardware, modeling, sensors, and basic localization and mapping techniques. Prerequisites: ME 322, ENGR 200, and MATH 266. F, odd years.

**ME 558. Convective Heat Transfer. 3 Credits.**
Advanced study of convection and radiation heat transfer. Solution methodologies to classical heat conduction problems will be introduced. Topics include: multidimensional steady conduction via separation of variables and principle of superposition; transient conduction with time-dependent boundary conditions via method of complex temperatures; numerical solutions to heat conduction problems; spectral dependence of radiation; blackbody and gray surface radiation; radiation exchange between surfaces; radiation shield. Prerequisite: ME 474 or consent of instructor.

**ME 559. Design Projects. 3 Credits.**
A three to six credit course of engineering design experience involving individual effort and formal written report. Prerequisites: Restricted to Master of Engineering students and subject to approval by the student's advisor.

**ME 996. Continuing Enrollment. 1-12 Credits.**
Repeatable. S/U grading.

**ME 997. Independent Study. 2 Credits.**

**ME 998. Thesis. 1-6 Credits.**
Development and documentation of scholarly activity demonstrating proficiency in Mechanical Engineering at the master’s level. Repeatable to 6 credits. F,S,SS.

**ME 999. PhD Student Doctoral Dissertation. 1-18 Credits.**
PhD student doctoral dissertation. Prerequisite: Admission to the PhD in Mechanical Engineering Program and consent of the instructor. Repeatable to 18 credits. S/U grading. F,S,SS.

**Undergraduate Courses for Graduate Credit**

**ME 420. Composite Materials. 3 Credits.**
Prerequisites: ME 301 and admission to the professional Mechanical Engineering program. On demand.
ME 424. Systems Dynamics and Control. 3 Credits.
Theory, analysis, and design of linear closed-loop control systems containing
LaPlace transforms, Nyquist and Bode diagrams are covered. Prerequisites:
MATH 266, ME 322, and admission to the professional Mechanical Engineering
program. On demand.

ME 426. Mechanical Vibrations. 3 Credits.
Vibration analysis and design as it applies to single and multi degree freedom
mechanical systems, isolation and absorption of vibration, vibration of
continuous systems, numerical methods of solution. Prerequisites: ENGR 202
with a grade of C or better, MATH 266, and admission to the professional
Mechanical Engineering program. S.

ME 428. Advanced Manufacturing Processes. 3 Credits.
Individual projects involving the manufacturing economics and flow charts
for selected products and basic technical principles of manufacturing processes.
Includes laboratory. Prerequisites: ME 418 and admission to the professional
Mechanical Engineering program. On demand.

ME 429. Introduction to Finite Element Analysis. 3 Credits.
Finite element analysis is introduced as a design tool. Emphasis is given to
modeling techniques and element types. Matrix methods are used throughout
the class. Prerequisites: ENGR 203 with a grade of C and admission to the
professional Mechanical Engineering program. On demand.

ME 439. Introduction to Robotics. 3 Credits.
A systems engineering approach to robotics. Presents an introduction to
manipulators, sensors, actuators, and end effectors for automation. Topics
covered include kinematics, dynamics, control, programming of manipulators,
pattern recognition, and computer vision. Prerequisites: ENGR 200 with a
grade of C or better, MATH 166 with a grade of C or better, and admission to
the professional Mechanical Engineering program. On demand.

ME 446. Gas Turbines. 3 Credits.
General principles, thermodynamics, and performance of gas turbine engines.
Design consideration of engine components. Prerequisites: ME 341 with a
grade of C or better and admission to the professional Mechanical Engineering
program. On demand.

ME 449. Internal Combustion Engines. 3 Credits.
Fundamentals of spark ignition and compression ignition engines, related
components and processes. Prerequisites: ME 342 and admission to the
professional Mechanical Engineering program. On demand.

ME 451. Heating and Air Conditioning. 3 Credits.
Psychrometrics, heating and cooling loads and analysis of air conditioning
systems. Prerequisites: ME 342 and admission to the professional Mechanical
Engineering program or consent of instructor. Corequisite: ME 474. On demand.

ME 464. Computational Fluid Dynamics. 3 Credits.
Provides a practical experience using computational fluid dynamics and
provides supporting material in fluid dynamics. topics are useful in understanding
the need to resolve grids in boundary layers and other regions of high velocity
gradients. The course is structured as half lecture and half laboratory. The
lecture covers topics related to laminar and turbulence boundary layers with
and without acceleration, turbulence modeling, wakes and jets. The laboratory
provides experience in building grids using the program GAMBIT, the solid/fluid
modeling and meshing program, and calculating solutions using FLUENT, a
commercial flow solver. Prerequisites: ME 306, MATH 266, and admission to
the professional Mechanical Engineering program. On demand.

ME 466. Aerodynamics. 3 Credits.
ME 466 Aerodynamics is an introductory course on the fundamentals of
aerodynamics for engineers. The class will cover a review of fluid mechanics
including boundary layers and compressible flow. The course topics include
parameters for airfoil and wings, incompressible flow over airfoils and wings
of infinite and finite span, compressible and transonic flow over wings and
aircraft, supersonic flow over thin airfoils, and supersonic flow over wings and
airplane configurations. The course will follow a standard text "Aerodynamics
for Engineers," 6th Edition by Bertin and Cummings. The course will qualify as
either a thermal fluid science elective or an aerospace concentration elective.
Prerequisites: ME 306 and ME 341. S, odd years.

ME 476. Intermediate Fluid Mechanics. 3 Credits.
Differential forms of conservation of mass, energy, and momentum for viscous
fluid flow. Boundary layer theory and its applications. Principles of one-
dimensional compressible flow. Prerequisites: ME 306, MATH 266, and
admission to the professional Mechanical Engineering program. On demand.

ME 477. Compressible Fluid Flow. 3 Credits.
Introduction to the theory and application of one-dimensional compressible
flow. Course topics include isentropic flow in converging and converging/
diverging nozzles, normal shock waves, oblique shock waves, Prandtl-Meyer
flow, flow with friction and heat addition. Prerequisite: Admission to the
professional Mechanical Engineering program. Prerequisites or Corequisites:
ME 341 with a grade of C or better and ME 306. On demand.

ME 484. Ground Vehicle Dynamics. 3 Credits.
ME 484 is a junior and senior level elective course. This course deals with
the design of ground vehicle suspension and steering systems. Vehicle ride,
handling and safety systems are covered along with passive and active
suspension control. Prerequisite: ME 322 and admission to the professional
Mechanical Engineering program or consent of instructor. On demand.

ME 485. Multiphysics Modeling. 3 Credits.
Theory and techniques of modeling coupled thermal, fluid, mechanical, and/
or electrical fields in components design. The focus is on the fundamental
techniques used to simultaneously derive and solve coupled equations and the
use of commercial multi physics finite element software. Prerequisite: ME 323.
S.

ME 490. Special Laboratory Problems. 1-3 Credits.
Laboratory investigations of interest to students and faculty. Repeatable to
maximum of 6 credits. Prerequisites: Consent of instructor and admission to the
professional Mechanical Engineering program. Repeatable to 6 credits. On demand.

Doctor of Philosophy in Mechanical Engineering

Admission Requirements
1. A baccalaureate degree in an engineering or related discipline with a GPA
   of 3.5 or higher or a Master of Science degree in an engineering or related
discipline.
2. Satisfy the School of Graduate Studies’ English Language Proficiency
   requirements as published in the Academic Catalog.
3. In addition to meeting the general provisions in the UND Academic
   Catalog and the minimum requirements in items 1-2 above, candidates are
   assessed using a holistic process that considers the student’s Record of
   Publications, GRE test scores (for students who are applying with a B.S.
   engineering degree from a non-ABET accredited program), transcripts of
   previous college work, relevant research and work experience, letters of
   recommendation, research interests, and English language skills. Students
   are strongly encouraged to contact individual faculty members in their area
   of research interest prior to applying.
4. Students admitted to an engineering M.S.M.E. program but meeting the
   minimum requirements in items 1-2 above, may, after one calendar year
   and upon the recommendation of his/her advisory committee, request to
   by-pass the master’s degree and work directly toward the Ph.D. degree.
   If the request is approved by the student’s advisory committee, the
   student will be given the qualifying exam. Passing this exam will advance
   the student to Approved Status in the Doctoral Program in Mechanical
   Engineering.

Financial Assistance
Financial aid in the form of teaching and research assistantships is available
on a competitive basis. Students seeking financial aid should complete their
applications by February 15th for Fall or Summer admission and September
15th for Spring admission to be given full consideration. Assistantships
are renewable for up to four years of support if progress toward the degree and
instructional/research service are satisfactory, subject to the availability of
funding. Students should contact faculty in their area(s) of research interest
to inquire about funding availability for upcoming terms.

Degree Requirements
Students seeking the Doctor of Philosophy degree at the University of North
Dakota must satisfy all general requirements set forth by the School of
Graduate Studies as well as particular requirements set forth by the Mechanical
Engineering Doctoral Program. The following requirements are in addition to
the UND School of Graduate Studies general requirements for the Ph.D.:
1. 90 semester credits beyond the baccalaureate degree must be completed.
2. A 3.0 GPA must be maintained for all classes completed as a graduate student.
3. Scholarly Tools: Proficiency in mathematics must be demonstrated by completing nine approved credits of mathematics intensive coursework (equivalent to UND 400-level or higher courses) with a grade of B or better.
4. A maximum of 30 credit hours can be transferred from a master's program.
5. A minimum of 30 credit hours must be doctoral research and dissertation.
6. Exactly 3 credit hours of the ME 562 or CHE 562- Graduate Seminar must be taken.
7. A minimum of 39 credit hours of non-research/dissertation coursework is required (up to 21 credit hours of coursework may be transferred from a master’s program in fulfilling this requirement subject to the credit transfer limits described in the general section of this Academic Catalog). The coursework shall include a minimum of 27 credit hours of Mechanical Engineering (or relevant courses with the consent of the student’s advisor) coursework selected from the approved list of ME graduate level courses published in the UND Academic Catalog. Equivalent graduate level coursework may be transferred from a master’s program.
8. Four (4) written qualifying examinations must be successfully completed. They must be taken no later than the end of their second year of residence. One of the exam topics must be applied mathematics. The other examination topics must be selected from the following list:

<table>
<thead>
<tr>
<th>Thermodynamics</th>
<th>Solid Mechanics</th>
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</thead>
<tbody>
<tr>
<td>Fluid Mechanics</td>
<td>Robotics</td>
</tr>
<tr>
<td>Heat Transfer</td>
<td>Dynamics</td>
</tr>
<tr>
<td>Materials Science</td>
<td>Controls</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>Vibration</td>
</tr>
</tbody>
</table>

Topics for the examinations should be selected in consultation with the student’s advisor.

Qualifying examinations will be offered once per year during the fifth week of the spring semester. Students must notify the ME Graduate Director no later than the end of the second week of the spring semester of 1) their intention to take the exams, 2) their selected exam topics. No student will be required to complete more than two exams per day. Each exam will be two hours in length. No later than the 10th week of each fall semester, faculty that will be administering spring exams will determine what, if any, reference materials students will be allowed to use during their exam. A list of potential exam administrators will be available from the ME Graduate Director. Students should consult individual faculty as the allowable materials may vary from exam to exam.

Students will be awarded a grade of pass (score of 80% or higher on all exams), conditional pass (80% or higher on three exams), or fail. Students achieving a grade of conditional pass may be required to retake the exam on which they scored <80%, enroll in specific courses, or complete other remedial actions at the discretion of the examining faculty and the student’s advisory committee. Students failing (<80%) two or three exams will be required to retake all four exams. Examination retakes must occur during the next regular qualifying examination period. Students failing all four exams will be removed from the PhD program at the end of the semester in which the exams were taken. Students failing an exam area more than once will be removed from the PhD program at the end of the semester in which the exam was retaken. A direct admit student who fails an exam a second time may request to be reclassified as a Master’s student at the discretion of the student’s advisor and the ME Graduate Director.

1. PhD students will complete a preliminary examination at least one year prior to their planned graduation date. The examination will consist of an oral presentation to their thesis committee of their progress to date and expected work to complete their degree. The committee will assess the presentation, progress and plan on a pass/fail basis. The preliminary examination must be passed prior to graduation. A student who fails the process more than once will be removed from the Ph.D. program.
2. A candidate for the degree must complete the original basic research investigation as documented in the research proposal. Each candidate will complete the research investigation to the satisfaction of the research advisor and the advisory committee and will prepare a written dissertation covering the research. The project must represent an original and independent investigation by the student. It is expected that the results of the research will be submitted for publication in refereed research journals. The candidate will submit the dissertation to the examining committee at least four weeks prior to defense date. The examining committee consists of the student’s advisory committee and an external examiner from outside the Department. The Department encourages the addition of a member from outside the University.
3. The candidate must present and successfully defend the dissertation at the final examination (see School of Graduate Studies requirements (https://und.edu/academics/graduate-school)). Four results of the examination can be obtained: 1) pass; 2) minor revision 3) major revision and 4) fail. For minor revisions there is no need for another defense session and upon revising the dissertation the examining committee can pass the student. For major revisions the student is asked to fundamentally revise the methodologies and schedule another defense session. If failed, the student will not be able to obtain a PhD degree and may request to be reclassified as a master’s student and complete a Master of Science degree.
4. The candidate, with the consent of their advisor, must submit at least one peer reviewed journal article (as the first author), submit one conference paper (as the first author), and make one conference presentation.

Residence Requirements

The purpose of residence requirements is to provide an opportunity for a sustained and concentrated intellectual effort, to provide for immersion in an academic research environment, and to permit extensive interaction with fellow students and faculty of the Mechanical Engineering Department. Within the first two years of graduate work at UND, at least two consecutive semesters must be completed in residence. During residency, a student must be taking the appropriate credits to qualify as a full-time student. The student’s program of study must be completed within the seven-year period normally allowed for graduate programs.

Under special circumstances, the student in conjunction with his/her advisory committee and the Mechanical Engineering Graduate Faculty, can petition the Dean of the School of Graduate Studies for variances in this policy.

Graduate Certificate in Unmanned Aircraft Systems Engineering

This program prepares students who have a strong interest related to the Unmanned Aircraft Systems Engineering field. All of the general requirements for enrollment, participation, and completion of a degree documented in the catalog of the University of North Dakota as appropriate shall be required. Specific requirements over and above the general catalog requirements are as follows:

Admission Requirements

1. Bachelor of Science degree from an ABET accredited engineering program, or
2. Students holding a B.S. degree in other disciplines may be admitted to Qualified Status with an obligation to acquire the necessary background undergraduate engineering knowledge. The exact requirements will be determined on a case-by-case basis, and/or
3. Graduate Record Examination General Test for applicants from non-ABET accredited programs, and
4. Minimum G.P.A is 3.0 (4.0 scale) is required. Conditional admittance may be obtained for G.P.A.s less than 3.0.

Certificate Requirements (9 Credits)

Choose 3 courses from the Required Core (9 Credits):

| ENGR 590 | Special Topics in Engineering (UAS in Engineering) | 3 |
| EE 511   | Power Electronics                                  | 3 |
| CSCI 490 | Autopilot programming (Autopilot Programming)      | 3 |
| GEOL 474 | (Introduction to GIS and Laboratory)               | 3 |
Master of Engineering in Mechanical Engineering

Admission Requirements
The applicant must meet the School of Graduate Studies' current minimum general admission requirements as published in the graduate catalog.

1. B.S. degree in Mechanical Engineering from an ABET accredited program and have an acceptable GPA
2. GRE general test required for those applicants with undergraduate degrees from other than ABET accredited programs.
3. 2.50 overall undergraduate GPA or a GPA of at least 2.75 for the junior and senior years of their undergraduate programs.
4. Satisfy the School of Graduate Studies' English Language Proficiency requirements as published in the graduate catalog.
5. Students seeking admission to a combined B.S./Master’s program must have a GPA of at least 3.0 at the time of admission.

Students who hold an undergraduate engineering or science degree other than mechanical engineering may be admitted to provisional or qualified status with an obligation to acquire additional background in mechanical engineering as appropriate.

Degree Requirements
Students seeking the Master of Engineering degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies’ as well as particular requirements set forth by the Mechanical Engineering Department.

1. 30 credits of course work approved by the graduate advisor.
2. 15 credits at the 500 level or above.
3. 9 credits of engineering science, basic science, and/or mathematics.
4. All major department courses must be at the 400 level or above, and no courses below 300 level may be included in the program.

Master of Engineering in Unmanned Aircraft Systems Engineering

This program prepares students who have a strong interest related to the Unmanned Aircraft Systems Engineering field. All of the general requirements for enrollment, participation, and completion of a degree documented in the catalog of the University of North Dakota as appropriate shall be required. Specific requirements over and above the general catalog requirements are as follows:

Admission Requirements
1. Bachelor of Science degree from an ABET accredited engineering program, or
2. Students holding a B.S. degree in other disciplines may be admitted to Qualified Status with an obligation to acquire the necessary background undergraduate engineering knowledge. The exact requirements will be determined on a case-by-case basis, and/or
3. Graduate Record Examination General Test for applicants from non-ABET accredited programs, and
4. Minimum G.P.A. is 3.0 (4.0 scale) is required. Conditional admittance may be obtained for G.P.A.s less than 3.0.

Degree Requirements (30 Credits)
1. Required Core (12 credits):
   - ENGR 590 Special Topics in Engineering (UAS in Engineering Design and Application) 3
   - EE 511 Power Electronics 3

2. Specialization Track (9 credits):
   Select One
   1. Mechanical Systems (3 courses from the Mechanical Engineering graduate course list)
   2. Electrical Systems (3 courses from the Electrical Engineering graduate course list)
   3. Computer Systems (3 courses from the Computer Science graduate course list)
   4. Elective Courses (9 credits, approved by advisor)

Master of Science in Mechanical Engineering

Admission Requirements
The applicant must meet the School of Graduate Studies' current minimum general admission requirements as published in the graduate catalog.

1. B.S. degree in Mechanical Engineering from an ABET accredited program and have an acceptable GPA.
2. GRE general test required for applicants with undergraduate degrees from other than ABET accredited programs.
3. 2.75 overall undergraduate GPA or a GPA of at least 3.00 for the junior and senior years.
4. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.
5. Students seeking admission to a combined B.S./Master’s program must have a GPA of at least 3.0 at the time of admission.

Students who hold an undergraduate engineering or science degree other than mechanical engineering may be admitted to provisional or qualified status with an obligation to acquire additional background in mechanical engineering as appropriate.

Degree Requirements
Students seeking the Master of Science degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies’ as well as particular requirements set forth by the Mechanical Engineering Department.

Thesis Option
1. A minimum of 30 semester credits in a major field approved by the graduate committee, including the credits granted for the thesis and the research leading to the thesis.
2. At least one-half of the credits must be at or above the 500-level.
3. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.
4. At least 21 credits of coursework.
5. Completion of a research project and its presentation in a thesis (4-6 credits for ME 998 Thesis).

Non-Thesis Option
1. Thirty-two (32) credits including credits approved by the graduate advisor required for the major.
2. Two credits of ME 997 Independent Study.
3. At least one-half of the credits must be at or above the 500-level.
4. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.
5. Preparation of a written independent study approved by the faculty advisor.
6. Comprehensive final examination.
Master of Science in Unmanned Aircraft Systems Engineering

This program prepares students who have a strong interest related to the Unmanned Aircraft Systems Engineering field. All of the general requirements for enrollment, participation, and completion of a degree documented in the catalog of the University of North Dakota as appropriate shall be required. Specific requirements over and above the general catalog requirements are as follows:

Admission Requirements
1. Bachelor of Science degree from an ABET accredited engineering program, or
2. Students holding a B.S. degree in other disciplines may be admitted to Qualified Status with an obligation to acquire the necessary background undergraduate engineering knowledge. The exact requirements will be determined on a case-by-case basis, and/or
3. Graduate Record Examination General Test for applicants from non-ABET accredited programs, and
4. Minimum G.P.A. is 3.0 (4.0 scale) is required. Conditional admittance may be obtained for G.P.A.s less than 3.0.

Degree Requirements (30 Credits)
1. Required Core (18 credits):
   - ENGR 590 Special Topics in Engineering (UAS in Engineering Design and Application) 3
   - EE 511 Power Electronics 3
   - CSCI 490 Autopilot Programming (Autopilot Programming) 3
   - GEOL 474 (Introduction to GIS and Laboratory) 3
   - Thesis 6
2. Specialization Track (9 credits)
   Select One:
   - Mechanical Systems (3 courses from the Mechanical Engineering graduate course list)
   - Electrical Systems (3 courses from the Electrical Engineering graduate course list)
   - Computer Systems (3 courses from the Computer Science graduate course list)
3. Electives (3 credits approved by advisor)
4. Cooperative Education (industrial or research lab, 0-3 credits)

English Language and Literature
M.A. in English (p. 458)
Ph.D. in English (p. 457)

Courses
ENGL 500. Introduction to Graduate Studies. 2 Credits.
Required of all candidates for advanced degrees in English. An introduction to graduate study and the profession.
ENGL 501. Teaching College English. 3 Credits.
An introduction to theories and methods of teaching college English. Required of Graduate Teaching Assistants in English.
ENGL 501L. Teaching College English Laboratory. 1 Credit.
ENGL 510. History of Literary Criticism. 3 Credits.
A history of European criticism from the Classical Greek period to the present day, with emphasis on major texts.
ENGL 511. Problems in Literary Criticism. 3 Credits.
A course in applied criticism. Repeatable when topics vary. Repeatable.
ENGL 516. Creative Writing: Fiction Workshop. 3 Credits.
Allows students to receive graduate-level instruction in a workshop setting, meeting regularly with other students, sharing their work, and critiquing one another's work. The purpose of this course is to enable the student to produce fiction of professional quality, such as that needed for a graduate thesis in creative writing. Repeatable to a total of 6 credits for M.A. students, 9 credits for Ph.D. students. Prerequisite: Upper-division undergraduate work in creative writing or permission of instructor. Repeatable to 6 credits.
ENGL 517. Creative Writing: Poetry Workshop. 3 Credits.
The subject of study will vary from semester to semester, and the course may be repeated for credit when the subject of study differs. Repeatable.
ENGL 520. Studies in English Literature. 1-3 Credits.
The subject of study will vary from semester to semester, and the course may be repeated for credit when the subject of study differs. Repeatable.
ENGL 522. Studies in English Language. 1-3 Credits.
The subject of study will vary from semester to semester, and the course may be repeated for credit when the subject of study differs. Repeatable.
ENGL 524. Studies in Creative Writing. 3 Credits.
Topics vary, such as advanced workshops in different genres and "reading for writers," studying the works of published writers as models for students' own creative work. Prerequisites: ENGL 413 or 414, upper-division undergraduate work in creative writing or permission of instructor. Repeatable to 6 credits.
ENGL 525. Studies in Composition and Rhetoric. 3 Credits.
This course investigates selected topics in composition and rhetorical studies. The subject of study will vary from semester to semester, and the course may be repeated for credit when the subject of study differs. Repeatable to 12 credits. On demand.
ENGL 531. Seminar in English Literature. 3 Credits.
This class requires the preparation and delivery of a long research paper on an appropriate topic. Repeatable.
ENGL 532. Seminar in American Literature. 3 Credits.
Similar in method to English 531. Repeatable.
ENGL 533. Seminar in English Language. 3 Credits.
Similar in method to English 531. Repeatable.
ENGL 590. Readings. 1-4 Credits.
American Literature; Cinema; English Literature; English Language; or Creative Writing. Supervised independent study. Repeatable. Prerequisites: ENGL 500 and department consent. Repeatable.
ENGL 591. Readings for Ph.D. Comprehensive Examinations. 1-6 Credits.
Supervised independent study on approved topics. Repeatable for a maximum of 6 credits. This course is exempt from the normal "incomplete" reversion schedule. A grade is assigned upon completion of the appropriate comprehensive examination. Prerequisites: Department consent. Repeatable to 6 credits. On demand.
ENGL 593. Research. 1-4 Credits.
American Literature; Cinema; English Literature; English Language; or Creative Writing. Independent study of a problem in the field resulting in a long research paper or a series of short reports. Repeatable. Prerequisites: ENGL 500 and department consent. Repeatable.
The development of the language from the earliest times to the present. This will have hands-on opportunities to create new knowledge by working on moves the concept of publishing from hard copy to electronic copy. Students Examines the growing necessity for digital products in the humanities and special attention to tutoring. Prerequisite: ENGL 209. F.

An introduction to the principles of teaching English as a second language, with communication and on how to relate these findings to language learning and this course focuses on recent second language acquisition (SLA) of the verbal and visual arts. Repeatable when topics vary. Prerequisite: ENGL 225. Repeatable. S.

Period-specific study of literature. Repeatable if topics vary. Repeatable to 12 credits. On demand.

An investigation of the aesthetics of the film drama with a concentration on the theory and evaluation of the medium. This course examines the relationship of the verbal and visual arts. Repeatable when topics vary. Prerequisite: ENGL 226 or instructor's permission. Repeatable to 6 credits. F.

Continues the work of ENGL 306, Creative Writing: Fiction, at the advanced level. Prerequisite: ENGL 306 or instructor's permission. Repeatable to 6 credits. S.

A course for advanced students on topics varying from year to year. Repeatable. Repeatable. S.

This course focuses on recent second language acquisition (SLA) research findings from the areas of linguistics, psychology, education, and communication and on how to relate these findings to language learning and teaching. Prerequisite: ENGL 209. F.

ENGL 428. Digital Humanities. 3 Credits.
Examines the growing necessity for digital products in the humanities and moves the concept of publishing from hard copy to electronic copy. Students will have hands-on opportunities to create new knowledge by working on projects across campus such as digitizing materials in the library's special collections department and working directly with professors' research initiatives. F, even years.

ENGL 442. History of the English Language. 3 Credits.
The development of the language from the earliest times to the present. This course is recommended for all prospective English teachers. S.

Doctor of Philosophy in English

Admission Requirements

The applicant must meet the School of Graduate Studies' current minimum general admission requirements as published in the graduate catalog.

1. A four-year bachelor's degree from a recognized college or university.
2. Twenty semester credits of English beyond the communication requirement with a 3.00 grade point average or better.
3. Undergraduate work in at least one language other than English equivalent to the first two college-level years or by demonstrating (by Educational Testing Service or by Languages Department examination) a reading knowledge of one language other than English or the satisfactory completion of two semesters each of two languages other than English. In some cases, students may be admitted without the language requirement and may complete it as part of the MA. program.
4. A writing sample of 10-15 pages on topics or in modes appropriate to the proposed program of study (submitted directly to the department). Applicants who plan to major in creative writing should also submit an analytical paper.
5. Graduate Record Examination General Test required. Literature in English Advanced Test is recommended.
6. Satisfy the School of Graduate Studies' English Language Proficiency requirements as published in the graduate catalog.
7. A master's degree of at least 30 semester credits of courses in literature and English language or in an acceptable combination of these and related subjects. (Graduate courses taken elsewhere may, at the discretion of the Department, be accepted in lieu of courses that would otherwise be related at the University of North Dakota.)

Degree Requirements

Students seeking the Doctor of Philosophy degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the English Language and Literature Department.

1. ENGL 500 Introduction to Graduate Studies; ENGL 501 Teaching College English and ENGL 501L Teaching College English Laboratory (for Graduate Teaching Assistants only); and either ENGL 510 History of Literary Criticism or ENGL 511 Problems in Literary Criticism. Courses must be completed with grades of A or B (S for ENGL 501L Teaching College English Laboratory).
2. Up to ten credits in addition to the four credits allowed for the M.A. may be in Readings and Research courses.
3. ENGL 590 Readings 1-4
ENGL 591 Readings for Ph.D. Comprehensive Examinations 1-4
ENGL 593 Research 1-4
4. Evidence of the mastery of scholarly tools appropriate to the proposed field of studies is required, including proficiency in one language other than English to Level IV. Additional language study and/or other scholarly tools may be required as deemed appropriate by the student in consultation with his/her mentor, advisory committee, and the Director of Graduate Studies.
5. Completion of the comprehensive examinations, in areas or topics relevant to a student's individual interests as recommended by the student's Advisory Committee. These will include three written comprehensive exams: 1) a written major field exam; 2) a written second field exam; and 3) a written special topic exam. The major and second field exams provide the kind of breadth of knowledge that goes beyond that developed through graduate coursework alone while the special topic exam is designed to begin the thought process necessary to conceptualizing and completing the dissertation. A fourth exam, an oral exam on the dissertation prospectus, is scheduled and completed within six months after completion of the written exams.
6. Fifteen (15) hours of credit may be granted for the dissertation, which may take the form of either a closely focused scholarly-critical investigation of a single topic, a creative work or group of works, or a number of related, publishable essays (critical, scholarly, bibliographical, methodological, pedagogical) which may be developed in combination with a project or
Thesis Option

1. A minimum of thirty-two credit hours are needed for the M.A., including the required courses listed below, the thesis (4 credits), and any Readings/Research courses (maximum 4 credits).
2. At least one-half of the credits must be at or above the 500-level.
3. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.
4. ENGL 500 Introduction to Graduate Studies; ENGL 501 Teaching College English and ENGL 501L Teaching College English Laboratory (for Graduate Teaching Assistants only); and either ENGL 510 History of Literary Criticism or ENGL 511 Problems in Literary Criticism. Courses must be completed with grades of A or B (S for ENGL 501L Teaching College English Laboratory).
5. Up to 4 credits of Readings and Research courses (ENGL 590 Readings and ENGL 593 Research) may be used to supplement the standard graduate offerings.
6. Evidence of the mastery of scholarly tools appropriate to the proposed field of studies is required, including Level IV proficiency in one language other than English.
7. The Critical Introductory Statement to the Portfolio will serve as the written comprehensive exam.
8. Required courses:

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<tr>
<th>Course</th>
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<tr>
<td>ENGL 500 Introduction to Graduate Studies</td>
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<tr>
<td>ENGL 501 Teaching College English</td>
<td>3</td>
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<tr>
<td>ENGL 501L Teaching College English Laboratory</td>
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<tr>
<td>ENGL 510 History of Literary Criticism</td>
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<td>or ENGL 511 Problems in Literary Criticism</td>
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<td>Electives</td>
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<td>ENGL 995 Scholarly Project</td>
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<tr>
<td><strong>Total Credits</strong></td>
<td><strong>27-30</strong></td>
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</table>

Non-Thesis Option

1. A minimum of thirty-two credit hours are needed for the M.A., including the required courses listed below, ENGL 598 Portfolio Workshop and ENGL 995 Scholarly Project, and any Readings/Research courses (maximum 4 credits).
2. At least one-half of the credits must be at or above the 500-level.
3. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.
4. ENGL 500 Introduction to Graduate Studies; ENGL 501 Teaching College English and ENGL 501L Teaching College English Laboratory (for Graduate Teaching Assistants only); and either ENGL 510 History of Literary Criticism or ENGL 511 Problems in Literary Criticism. Courses must be completed with grades of A or B (S for ENGL 501L Teaching College English Laboratory).
5. Up to 4 credits of Readings and Research courses (ENGL 590 Readings and ENGL 593 Research) may be used to supplement the standard graduate offerings.
6. Evidence of the mastery of scholarly tools appropriate to the proposed field of studies is required, including Level IV proficiency in one language other than English.
7. The Critical Introductory Statement to the Portfolio will serve as the written comprehensive exam.
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<td><strong>Total Credits</strong></td>
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Geography and Geographic Information Science

M.S. in Geography (p. 460)
M.A. in Geography (p. 460)

Certificate in Geographic Information Science (GISc)

The Geography department offers a graduate certificate in Geographic Information Science (GISc). GISc is the foundation of Geographic Information Systems (GIS), which integrate spatial data sets in the form of digital maps, digital aerial photos, satellite imagery, and global positioning system (GPS) coordinates. The goal of GISc is to model landscapes digitally and to enable the characterization of spatial and temporal processes.

Certificate students must be admitted to UND as either full or part-time graduate students. Application for admission must be made to the UND School of Graduate Studies. The certificate is designed to serve:

1. Non-geography graduate students currently pursuing a graduate degree from UND, and
2. Non-degree-seeking professionals already holding a graduate and/or baccalaureate degree who seek to "re-tool."

The courses taken in a previously completed GISc certificate program may be applied to a Master's degree in Geography.
Admission Requirements
1. A baccalaureate degree from an accredited university.
2. A GPA of at least 2.75 in all undergraduate work.

Certificate Requirements
Successful completion of the 12-credit GiSc Certificate requires the following:
1. Completion of the nine credits of core courses (see below).
2. Completion of at least three credit hours of elective courses (see below).
3. A minimum grade point average of 3.00.
4. Completion time of no more than five years.

5. Required Core Courses

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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tr>
<td>GEOG 471</td>
<td>Cartography and Visualization</td>
<td>3</td>
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<tr>
<td>&amp; 471L</td>
<td>and Cartography and Visualization Laboratory</td>
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<tr>
<td>GEOG 474</td>
<td>Introduction to Geographic Information Systems</td>
<td>3</td>
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<tr>
<td>&amp; 474L</td>
<td>(GIS) and GIS Laboratory</td>
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<tr>
<td>GEOG 574</td>
<td>Advanced Techniques in Geographic Information</td>
<td>3</td>
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<tr>
<td>Systems</td>
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Elective Courses
Select one of the following:

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<tr>
<th>Course Code</th>
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<th>Credits</th>
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<tbody>
<tr>
<td>GEOG 377</td>
<td>Quantitative Applications in Geography</td>
<td>3</td>
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<tr>
<td>&amp; 377L</td>
<td>and Spatial Analysis Laboratory</td>
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<tr>
<td>GEOG 475</td>
<td>Digital Image Processing</td>
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<tr>
<td>GEOG 476</td>
<td>Selected Topics in Geographic Information Systems</td>
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<tr>
<td>GEOG 575</td>
<td>Seminar in Remote Sensing</td>
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<tr>
<td>GEOG 591</td>
<td>Directed Study in Geographical Problems</td>
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Undergraduate Courses for Graduate Credit

GEOG 421. Selected Topics in Physical Geography. 3 Credits.
An examination of an advanced physical geography topic chosen from field methods, biogeography, human impact on the environment, physiography, or others. Repeatable to nine credits if different topics are examined. Prerequisite: GEOG 121 or consent of instructor. Repeatable to 9 credits. F,S.

GEOG 453. Historical Geography. 3 Credits.
Using the spatial approach, landscape change is analyzed over time in various regions of the world using a variety of scales of study. Emphasis is placed upon the relationship of historical geography to historic preservation and tourism. On demand.

GEOG 457. Urban Geography and Planning. 3 Credits.
This course examines the internal workings of cities from political, economic, and social perspectives. Geographic approaches to urban analysis are discussed, as are various methods for contemporary urban planning. Students learn to view the city as a geographic phenomenon created by human effort. S.

GEOG 462. Geography of North America II. 3 Credits.
A regional analysis of the physical, cultural, and economic features of a selected region or group of regions within North America. May be repeatable to six credits if a different region is examined. Prerequisite: GEOG 262 or consent of instructor. On demand.

GEOG 463. Regional Geography. 2-3 Credits.
A regional and topical analysis of the physical and cultural features with emphasis on one continent or region. May be repeated up to nine credits provided different regions and approaches are involved. Repeatable to 9 credits. S.

GEOG 471. Cartography and Visualization. 2 Credits.
This course examines the art, science, and technology of cartography and visualization. It familiarizes students with basic cartographic principles and with GIS, both of which are applicable to a wide range of professional fields and academic disciplines. Students learn how maps are designed and used to accurately represent and effectively communicate spatial phenomena and relationships. The course also includes a discussion of selection of proper thematic mapping techniques. Corequisite: GEOG 471L. F.

GEOG 471L. Cartography and Visualization Laboratory. 1 Credit.
Students apply concepts learned in GEOG 471 to produce accurate, appropriate and well-designed maps using GIS software. Lab activities hone the ability of students to be informed producers and consumers of maps and provide hands-on experience that demonstrates how maps function as a communicative visual medium. Corequisite: GEOG 471. F.

GEOG 474. Introduction to Geographic Information Systems (GIS). 2 Credits.
An introductory course that examines the digital representation, manipulation, and analysis of geographic data, with emphasis on the analytical capabilities that GIS brings to bear on the solution of geographic problems. Prerequisites: GEOG 471 and 471L or equivalent or consent of instructor. Corequisite: GEOG 474L. F,S.

GEOG 474L. GIS Laboratory. 1 Credit.
Hands-on application of theory and methods associated with digital spatial data representation, manipulation, and analysis. Corequisite: GEOG 474. F,S.
GEOG 475. Digital Image Processing. 3 Credits.
A course focused on the concepts and principles involved in the use of digital remotely sensed data as they are applied to environmental monitoring and natural resource management. Emphasis is placed on algorithm development and 'hands-on' application of digital techniques to select imagery. Prerequisites: GEOG 374 and 374L. S.

GEOG 476. Selected Topics in Geographic Information Systems. 3 Credits.
An examination of a specific application area or set of techniques in GIS including, but not limited to, Business GIS, Environmental GIS, GIS Databases, GIS Scripting and Web-Based GIS. Repeatable to six credits if different topics are examined. Prerequisites: GEOG 474 and GEOG 474L or instructor consent. Repeatable to 3 credits. On demand.

Master of Arts in Geography

Admission Requirements
The applicant must meet the School of Graduate Studies' current minimum general admission requirements as published in the graduate catalog.
1. A four-year bachelor's degree from a recognized college or university.
2. A GPA of at least 3.00 in all undergraduate work.
3. A minimum of 9 semester credits of undergraduate coursework in geography, preferably in human geography. An additional 6 credits in fields cognate to geography are also required. Cognate courses must be from at least two academic departments outside Geography.
4. Meet all School of Graduate Studies requirements for admission.
5. Satisfy the School of Graduate Studies' English Language Proficiency requirements as published in the graduate catalog.

Degree Requirements
Students seeking the Master of Arts degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Geography Department.

1. Four required courses:
   - GEOG 500 Graduate Studies in Geography 1
   - GEOG 501 Geographic Thought Through Time 2
   - GEOG 576 Field Methods and Analysis in Geography 3
   - GEOG 578 Geographic Research and Writing 2

   Total Credits 8

2. A minor or cognate area of study, and a graduate program of study that reflects the student's focus on human geography topics (9 credits).

Thesis
1. A minimum of 30 semester credits, including 9 semester credits for approved minor or cognate courses.
2. At least one-half of the credits must be at or above the 500-level.
3. A maximum of one-fourth (usually 8-9 semester credits) of the credit hours required for the degree may be transferred from another institution.
4. Preparation and successful defense of a thesis. (A minimum of 6 credits for GEOG 998 Thesis.)

Non-Thesis
1. A minimum of 36 semester credits, including 9 semester credits for approved minor or cognate courses.
2. A minimum of 12 credits that focus upon geospatial skills and techniques which include quantitative methods, computer graphics and mapping, geographic information systems, remote sensing, field methods, and cartography. The non-thesis programs emphasize development of geospatial skills that can be applied to specific problems and projects that may or may not involve research.
3. Two credits of GEOG 997 Independent Study are required.
4. At least one-half of the credits must be at or above the 500-level.
5. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.
6. Preparation of a written independent study approved by the faculty advisor.
7. Comprehensive final examination.

Geology and Geological Engineering

M.S. in Geology (p. 463)
M.A. in Geology (p. 463)
Ph.D. in Geology (p. 462)
M.S. in Geological Engineering (http://und-public.courseleaf.com/graduateacademicinformation/departmentalcoursesprograms/engineering/geologicalengineering/geoe-ms)

GEOE Courses

GEOE 555. Advanced Rock Mechanics. 3 Credits.
Fundamentals of rock mechanics, elasticity theory of rock, failure criterion of rocks, laboratory and field testing methods, field instrumentation, the applications of rock mechanics in mining, tunneling and rock slopes engineering, and the applications of numerical methods in rock mechanics.
Prerequisites: GEOE 323 and ENGR 203. F.

GEOE 591. Advanced Hydrocarbon Extraction in Engineering. 3 Credits.
This course describes technologies that can be applied to further recover underground energy resource - oil/gas, for example, that cannot be produced by primary or second extraction. Development of these processes requires significant technological advances in our understanding of underground mining from hydrocarbon reservoirs and may be the stimulus for future technological development. Prerequisites: GEOE 301, MATH 166, MATH 266, CHEM 122, and CHEM 122L. F.

GEOE 599. Doctoral Research. 1-15 Credits.
Research contributing to the discovery and dissemination of knowledge and/or technology in Geological Engineering and contributing to the student's doctoral dissertation. Prerequisite: Admission to the PhD program in Geological Engineering. Repeatable to 15 credits. F,S,SS.

GEOE 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

GEOE 998. Thesis. 1-9 Credits.

GEOE 999. Dissertation. 1-18 Credits.
PhD student doctoral dissertation. Prerequisite: Admission to the PhD program in Geological Engineering. Repeatable to 18 credits. S/U grading. F,S,SS.

Undergraduate Courses for Graduate Credit

GEOE 323. Engineering Geology. 2 Credits.
This course is to introduce the application of geological, hydrological and environmental principles to geotechnical/geological engineering design, construction and operation as well as various geohazards. Prerequisites: One introductory geology course and MATH 165. S.

GEOE 417. Hydrogeology. 3 Credits.
Physical and chemical aspects of groundwater movement, supply, and contamination. Prerequisites: CHEM 121 or CHEM 221; MATH 166 or consent of instructor. F.

GEOE 418. Hydrogeological Methods. 2 Credits.
Field and laboratory methods used in hydrogeology; techniques of drilling, well and piezometer installation, determination of aquifer parameters, geophysical exploration, soil classification and analysis, ground water sampling and analysis. Includes field trip. Prerequisite: GEOE 417. F.

GEOE 419. Groundwater Monitoring and Remediation. 3 Credits.
Statistical methods for groundwater sampling and monitoring network design. Groundwater remediation and design; including strategies that remove contaminants for external treatment and strategies for in-situ contaminant treatment. Prerequisites: MATH 166, GEOE 417 and a statistics course (ECON 210, PSYC 241, MATH 321 or MATH 353) or consent of instructor. S.

GEOE 425. Design Hydrology for Wetlands. 3 Credits.
Principles of chemistry, geology, hydraulics, and hydrology applied to natural and constructed wetlands and other small catchments. Prerequisites: CHEM 121 and either CE 306/ME 306 or GEOE 417. S.

GEOE 427. Groundwater Modeling. 3 Credits.
Fundamentals of numerical modeling applied to groundwater flow. Spreadsheet calculations will be used to demonstrate the finite difference method applied to groundwater movement and storage. Simulation of practical groundwater problems will be performed with the U.S. Geological Survey's MODFLOW code. Prerequisites: GEOE 417 and MATH 265; some programming experience is recommended. On demand.

GEOE 455. Geomechanics. 3 Credits.
The objective of this course is to train the students to use fundamental principles and field and lab techniques of Rock Mechanics to analyze real-world problems, identify the optimal methods, and solve the practical geological engineering problems with the combination of field and laboratory, analytical and experimental means. Emphasis will be on the fundamental principles and their application to practical engineering problems, both surface and underground. Prerequisites: GEOE 323 or consent of instructor. F.

GEOE 493. Selected Topics in Geological Engineering. 1-3 Credits.
Detailed study of selected topics in Geological Engineering. Includes laboratory if applicable. Repeatable. Repeatable. On demand.

GEOL Courses

GEOL 500. Sedimentary Geology. 1-4 Credits.
Selected topics in sedimentary geology, such as sedimentary processes, carbonate petrology, clastic petrology, and basin analysis. May be repeated up to 12 credits. Prerequisite: Consent of instructor. Repeatable to 12 credits. F.

GEOL 505. Isotope Geochemistry. 3 Credits.
Geochemistry and cosmochemistry of radioactive and stable isotopes; isotope equilibria; applications in paleoclimatology, environmental isotope geochemistry, igneous, metamorphic, and sedimentary petrology. Prerequisite: GEOL 321 or permission of instructor.

GEOL 506. Glacial Geology. 4 Credits.
Origin, growth, and movement of glaciers; landforms and deposits incident to glaciation. 3 hours lecture, 2 hours laboratory time per week. Prerequisite: GEOL 311.

GEOL 509. Advanced Mineralogy. 1-4 Credits.
Advanced study of specific mineral groups or selected topics in mineralogy. Prerequisite: GEOL 320; recommended prerequisite GEOL 321.

GEOL 511. Advanced Structural Geology. 4 Credits.
Reading and research in special topics in structural geology and geotectonics.

GEOL 512. Advanced Petrology. 1-4 Credits.
Selected topics in petrology taught using conventional lecture and laboratory/field approach. Prerequisite: GEOL 320.

GEOL 515. Advanced Paleontology. 3 Credits.
Selected topics include (but not limited to): Invertebrate paleontology; vertebrate paleontology; paleoecology; taxonomy; museum studies; western continental stratigraphy; critical boundaries. May be repeated. Prerequisites: GEOL 415, BIOL 150, or consent of instructor. Repeatable to 40 credits. On demand.

GEOL 518. Topics in Advanced Stratigraphy. 2-4 Credits.
Selected topics in lithostratigraphy and biostratigraphy. Prerequisites: GEOL 411, GEOL 415. Repeatable to 4 credits.

GEOL 520. Statistical Applications in Geology. 3 Credits.
The application of statistical techniques to geologic data and problems, with emphasis on analysis of geologic sequences, map analysis, and multivariate analysis of geologic data. Prerequisites: An introductory statistics course, such as CTL 515 or PSYC 241, and consent of instructor.

GEOL 522. History and Philosophy of Geology. 3 Credits.
Historical and philosophical development of the science of geology. Prerequisite: Permission of instructor.
GEOL 523. Topics in Advanced Geomorphology. 1-4 Credits.
Selected topics in geomorphic processes and landforms. Prerequisite: GEOL 311. Repeatable to 4 credits.

GEOL 525. Weathering and Soils. 3 Credits.
Properties and processes of soils; the factors and processes of weathering and soil formation. Prerequisite: GEOL 311 and GEOL 411, or consent of instructor.

GEOL 530. Topics in Physical Hydrogeology. 2 Credits.
Selected topics in groundwater, vadose-zone hydrology, fracture flow, analytical/numerical modeling, GIS and hydrology, and wetland soils/hydrology. Repeatable when topics vary. Prerequisite: Consent of instructor. Repeatable to 8 credits. F.S.

GEOL 531. Hydrogeochemistry. 3 Credits.
The origin, characteristics and modeling of surface and ground water geochemistry. Prerequisites: GEOL 521 and, MATH 166, or permission of instructor.

GEOL 532. Contaminant Hydrogeochemistry. 3 Credits.
Chemical and physical processes affecting contaminant behavior in groundwater with analytical/numerical modeling and case studies. Prerequisites: GEOE 417 and GEOE 427 and MATH 265, or consent of instructor.

GEOL 540. Water Sampling and Analysis. 3 Credits.
Techniques of water and sediment sampling and analysis using equipment in the UND Water Quality Laboratory. Results are interpreted in the context of the natural systems from which the samples are taken. Enrolment is limited to eight students per section. A laboratory fee is required. Prerequisite: CHEM 121.

GEOL 551. Heat Flow. 3 Credits.
An exploration of Earth's thermal structure, thermal history and heat sources. The course begins with the theory of heat transfer within and through the surface of terrestrial planets. Methods of observation and modeling provide hands-on experience in field and laboratory activities. Applications of heat flow to tectonics, petrology, thermal maturity of kerogen, hydrogeology, geothermics and climate change are presented with current examples. Prerequisite: Graduate standing. Corequisite: Permission of instructor. On demand.

GEOL 560. Geothermics I. 3 Credits.
A survey of the methods of geothermal exploration, assessment and production. The course covers the various methods for discovery and characterization of geothermal resources. Methods for assessment of energy in place and determination of recoverable energy are covered in depth. Current technologies for energy extraction and power production are presented with current examples. Prerequisite: Graduate standing. Corequisite: Permission of instructor. On demand.

GEOL 561. Geothermics II. 3 Credits.
The course covers the historical development of geothermal policies, regulations and practices globally and in different states within the US. Matters of water usage, contamination and disposal are covered extensively. Current issues such as induced seismicity, hydrofracture, power plant size and location, electrical grid access and land use are critically examined. Prerequisite: Senior or Graduate Standing. Corequisite: Permission of Instructor. On demand.

GEOL 590. Research. 1-4 Credits.
Laboratory, field, or library research on problems of interest (may be repeated). Repeatable.

GEOL 591. Directed Studies. 1-4 Credits.
Directed advanced research in a specialized field of geologic study (may be repeated). Repeatable.

GEOL 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

GEOL 997. Independent Study. 2 Credits.

GEOL 998. Thesis. 1-9 Credits.
Repeatable to 9 credits.

GEOL 999. Dissertation. 2-12 Credits.
May be repeated up to 24 credits. Repeatable to 24 credits.

Undergraduate Courses for Graduate Credit

GEOL 311. Geomorphology. 4 Credits.
Dynamics of weathering, mass movement, running water, groundwater, waves, wind and ice in the production of landforms. Includes field trips and laboratory. Prerequisites: GEOL 101 or GEOE 203; MATH 165, PHYS 211, CHEM 121 or consent of instructor. F.

GEOL 320. Petrology. 3 Credits.
Description, classification and origin of igneous, metamorphic, and sedimentary rocks. Field and laboratory study of rocks. Engineering properties of earth materials. Advanced aspects of optical mineralogy. Includes laboratory. Prerequisite: GEOL 318. F.

GEOL 321. Geochemistry. 3 Credits.
Application of the principles of chemistry to geologic and hydrogeologic problems. Origin and distribution of the chemical elements. Introduction to radiochemistry, isotopic geochronology, and stable-isotope geochemistry. Prerequisites: GEOL 318, CHEM 122, and MATH 165 or consent of instructor. S.

GEOL 340. Digital Mapping Methods. 3 Credits.
This course integrates "hands-on" data acquisitions and map generation with an overview of the technology (GPS, lasers, and data management). Field projects focus on mapping methodology and laboratory projects focus on analysis and presentation. It is assumed that students have an undergraduate geology background and a basic knowledge of computer applications. Prerequisite: Junior Standing in geology.

GEOL 407. Petroleum Geology. 3 Credits.
Origin, accumulation and geologic occurrence of petroleum and gas. Prerequisites: GEOL 101 or GEOE 203, and GEOL 102. F, odd years.

GEOL 411. Sedimentology and Stratigraphy. 5 Credits.
Origin, transportation, deposition, and diagenesis of sediments; principles and applications of stratigraphy. Includes field trip and laboratory. Prerequisite: GEOL 320. S.

GEOL 414. Applied Geophysics. 3 Credits.
Principles of various geophysical methods and their application to geologic problems. Prerequisites: GEOL 101 or GEOE 203; MATH 165; and PHYS 211 or 251. F.

GEOL 415. Introduction to Paleontology. 4 Credits.
The principles of paleontology/paleobiology are presented using fossils to document the evolutionary, stratigraphic, and paleoecologic history of animal and plant life on Earth. Includes field trip and laboratory. Prerequisites: GEOL 102; BIOL 150 and BIOL 151 are recommended prerequisites. F, even years.

GEOL 422. Seminar II. 1 Credit.
Continuation of GEOL 421 experience. Preparation and delivery of oral presentations in science and engineering, culminating in oral presentation of senior thesis (Geol 490) or Engineering Design (485). Includes critical review of student presentations and departmental guest lectures. Prerequisites: GEOL 421, senior or graduate status in departmental major. F.S.

Doctor of Philosophy in Geology

Admission Requirements

The applicant must meet the School of Graduate Studies' current minimum general admission requirements as published in the graduate catalog.

1. For admission to the geology Ph.D. program, applicants must hold a bachelor's degree in geology from an accredited college or university or otherwise demonstrate sufficient coursework, training, or experience in geoscience.

2. For "approved" status, students must have completed a 5-6 credit hour geology field course, along with satisfactory achievement in supporting science and mathematics, as determined by the department graduate admissions committee.

3. For all graduate programs in the Department of Geology and Geological Engineering, a cumulative 3.0 or higher grade point average is required.

4. Submission of a Graduate Record Examination (GRE) general test score is strongly recommended if you do not have a degree in geology. Applicants are encouraged to submit their GRE score to support their application.

Doctor of Philosophy in Geology
5. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

Students missing any of the above requirements may be admitted under provisional or qualified status, but all admission requirements must be completed, without graduate credit, within one year after beginning graduate work.

Initial decisions for admission and financial aid are made about March 1 for the fall semester and about September 1 for the spring semester.

Degree Requirements

Students seeking the Doctor of Philosophy degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Geology and Geological Engineering Department.

Students normally take the equivalent of three years of full-time work beyond the master’s degree for the doctorate.

1. Completion of 90 semester credits beyond the baccalaureate degree.
2. Maintenance of at least a 3.0 GPA for all classes completed as a graduate student.
3. With approval of a student’s Faculty Advisory Committee, up to one-half of the work beyond a master’s degree (maximum of 30 semester credit hours) may be transferred from another institution that offers post-master’s degrees in the discipline.
4. A qualifying examination may be required before the end of the student’s first year in a doctoral program.
5. Demonstration of:
   a. proficiency in two foreign languages, or
   b. proficiency in one foreign language and two scholarly tools courses, or
   c. proficiency in four scholarly tools courses (scholarly tools courses typically are advanced undergraduate courses in related fields in mathematics, science, or engineering).
6. Completion of a dissertation, which incorporates independent work that is an original contribution to knowledge.

Master of Arts in Geology

Admission Requirements

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. For admission to the geology M.A. program, applicants must hold a bachelor’s degree in geology from an accredited college or university or otherwise demonstrate sufficient coursework, training, or experience in geoscience.
2. Applicants may be admitted under “provisional” or “qualified” status, but to advance to “approved” status, they must have completed 5 to 6 credit hours of geology field course, or its equivalent, along with satisfactory achievement in supporting sciences and mathematics, as determined by the Harold Hamm School of Geology and Geological Engineering’s Graduate Admissions Committee.
3. Applicants must have a cumulative grade point average of 3.0 or higher.
4. Applicants are encouraged to submit their GRE score to support their application, especially if they do not have an undergraduate degree in geology.
5. Applicants must satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.
6. For a Master of Arts degree, students must complete two or more semesters of calculus while an undergraduate or graduate student.

Students missing any of the above requirements may be admitted under provisional or qualified status, but all admission requirements must be completed, without graduate credit, within one year after beginning graduate work.

Initial decisions for admission and financial aid are made about March 1 for the fall semester and about September 1 for the spring semester.

To encourage undergraduate geology students to extend their studies to include a graduate degree, the College of Engineering and Mines has a combined program that permits students to earn both a bachelor’s (B.S.) and a master’s (M.A.) degree in geology. This program allows students to designate two three-credit graduate courses to count for both degrees. The selected courses must have graduate course standing and be designated when a student requests admission to the program.

Students may be admitted to the Combined Degree program if they have:

1. Completed 95 credit hours towards the bachelor’s degree.
2. Completed 30 credit hours of coursework and 8 credit hours of upper division coursework in the geological sciences, including the equivalent of physical and historical geology.
3. Maintained an overall GPA of at least 3.0 in all geological sciences they took.
4. Completed an application to the UND School of Graduate Studies and been accepted for admission.

Once admitted to the Combined Degree Program, undergraduate students are eligible to take 500-level courses for graduate credit. Students must complete the petition titled, “Graduate Credit as an Undergraduate Student” prior to registering for the courses. Such courses could be included in the 30 credit hours for the degree and could appear in the program of study.

Students in the Combined Degree Program will be admitted to the School of Graduate Studies on completion of 125 credit hours for the bachelor’s degree.

The time normally needed to complete the Combined Degree Program is 1 year, plus an additional summer after admission to the Graduate School.

Degree Requirements

Students seeking the Master of Arts degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as the following particular requirements set forth by the Harold Hamm School of Geology and Geological Engineering.

1. Students must complete a program of study that includes a minimum of 30 credit hours, including the credits granted for the thesis and the research leading to the thesis.
2. At least 15 credit hours must be for classes at or above the 500-level.
3. A maximum of 7 credit hours required for the degree may be transferred from another institution.
4. A minimum of 6 credit hours (undergraduate or graduate) must come from each subject area listed below:
   a. mineralogy, petrology, geochemistry
   b. sedimentology, stratigraphy, paleontology, geomorphology
   c. structural geology, geophysics, hydrogeology
5. Up to 12 credit hours of 300-400 level coursework in geology may be taken for graduate credit.

The time normally needed to complete the requirements for the master’s degree in geology is about two years of full-time work. Students with graduate teaching or research assistantships may need more time.

Master of Science in Geology

Admission Requirements

The applicant must meet the School of Graduate Studies’ current minimum general admission requirement as published in the graduate catalog.

1. For admission to the geology M.S. program, applicants must hold a bachelor’s degree in geology from an accredited college or university or otherwise demonstrate sufficient coursework, training, or experience in geoscience.
2. Applicants may be admitted under “provisional” or “qualified” status, but to advance to “approved” status, they must have completed 5 to 6 credit hours of geology field course, or its equivalent, along with satisfactory achievement in supporting sciences and mathematics, as determined by the Harold Hamm School of Geology and Geological Engineering’s Graduate Admissions Committee.

Students must satisfy the School of Graduate Studies’ current minimum general admission requirement as published in the graduate catalog.

1. For admission to the geology M.S. program, applicants must hold a bachelor’s degree in geology from an accredited college or university or otherwise demonstrate sufficient coursework, training, or experience in geoscience.
2. Applicants may be admitted under “provisional” or “qualified” status, but to advance to “approved” status, they must have completed 5 to 6 credit hours of geology field course, or its equivalent, along with satisfactory achievement in supporting sciences and mathematics, as determined by the Harold Hamm School of Geology and Geological Engineering’s Graduate Admissions Committee.

Students must satisfy the School of Graduate Studies’ current minimum general admission requirement as published in the graduate catalog.
3. Applicants must have a cumulative grade point average of 3.0 or higher.
4. Applicants are encouraged to submit their GRE score to support their application, especially if they do not have an undergraduate degree in geology.
5. Applicants must satisfy the School of Graduate Studies' English Language Proficiency requirements as published in the graduate catalog.
6. For a Master of Science degree, students must complete 2 semesters of calculus, plus an additional calculus or relevant math, computer programming, or statistical class, while an undergraduate or graduate student.

Students missing any of the above requirements may be admitted under provisional or qualified status, but all admission requirements must be completed, without graduate credit, within one year after beginning graduate work.

Initial decisions for admission and financial aid are made about March 1 for the fall semester and about September 1 for the spring semester.

To encourage undergraduate geology students to extend their studies to include a graduate degree, the College of Engineering and Mines has a Combined Program that permits students to earn both a bachelor's (B.S.) and a master's (M.S.) degree in Geological Engineering. This program allows students to designate two three-credit graduate courses to count for both degrees. The selected courses must have graduate course standing and be designated when a student requests admission to the program.

Students may be admitted to the Combined Degree Program if they have:

1. Completed 95 credit hours towards the bachelor's degree.
2. Completed 30 credit hours of coursework and 8 credit hours of upper division coursework in the geological sciences, including the equivalent of physical and historical geology.
3. Maintained an overall GPA of at least 3.0 in all geological sciences they took.
4. Completed an application to the UND Graduate School and been accepted for admission.

Once admitted to the Combined Degree Program, undergraduate students are eligible to take 500-level courses for graduate credit. Students must complete the petition titled, "Graduate Credit as an Undergraduate Student" prior to registering for the courses. Such courses could be included in the 30 credit hours for the degree and could appear in the program of study.

Students in the Combined Degree Program will be admitted to the School of Graduate Studies on completion of 125 credit hours for the bachelor's degree.

The time normally needed to complete the Combined Degree Program is 1 year, plus an additional summer after admission to the Graduate School.

### Degree Requirements

Students seeking the Master of Science degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies, as well as the following particular requirements set forth by the Harold Hamm School of Geology and Geological Engineering:

1. Students must complete a program of study that includes a minimum of 30 credit hours, including the credits granted for the thesis and the research leading to the thesis.
2. At least 15 credit hours must be for classes at or above the 500-level.
3. A maximum of 7 of the credit hours required for the degree may be transferred from another institution.
4. A minimum of 6 credit hours (undergraduate or graduate) must come from each subject area listed below:
   a. Mineralogy, petrology, geochemistry
   b. Sedimentology, stratigraphy, paleontology, geomorphology
   c. Structural geology, geophysics, hydrogeology
5. Up to 12 credit hours of 300-400 level coursework in geology may be taken for graduate credit.

The time normally needed to complete the requirements for the master's degree in geology is about two years of full-time work. Students with graduate teaching or research assistantships may need more time.

### History

M.A. in History (p. 467)
D.A. in History (p. 465)
Ph.D. in History (p. 466)

### Courses

**HIST 501. Methods of Historical Research. 3 Credits.**
This course is intended to teach graduate students to comprehend, analyze, apply, and evaluate the basic techniques and frameworks for historical research. These include basic historical theories, methods, and problems (such as causality, objectivity, types of evidence, schools of historical thought, evaluation of sources, qualitative and quantitative analysis). Students will also learn how to use standard databases and bibliographical aids to find, identify, and assess appropriate information to support, modify, or reject historical interpretations and arguments. Prerequisite: Graduate status.

**HIST 502. Historiography. 3 Credits.**
Required for all candidates for advanced degrees in history. An introduction to the history of historical thought, from the classical Greeks to the present, with examination of some of the works of important historians writing in the western tradition. The first half of the course is primarily devoted to classical and European historians; the second half is primarily devoted to modern and American historians.

**HIST 503. Advanced Historical Methods. 3 Credits.**
This course introduces students to a specific historical research methodology through instruction and practice. Repeatable up to 6 credits. Repeatable to 6 credits.

**HIST 511. Research Seminar in American History. 3 Credits.**
Required for all candidates for the Doctor of Philosophy, Doctor of Arts, and Master of Arts who do not take History 515. This course requires preparation of a research paper. The subject of the research will be within an announced general topic area of American History. Repeatable. Repeatable.

**HIST 513. Research Seminar in World History. 3 Credits.**
This course introduces students to the research and writing of World History with a stress on the proper utilization of comparative and thematic methodology. It requires the preparation of a research paper that utilizes the methodology of World History.

**HIST 515. Research Seminar in European History. 3 Credits.**
Required for all candidates for the Doctor of Philosophy, Doctor of Arts, and Master of Arts who do not take History 511. This course requires preparation of a research paper. The subject of the research will be within an announced general topic area of European History. Repeatable. Repeatable.

**HIST 520. Material Culture. 3 Credits.**
This course introduces students to a material culture research methodology through reading, discussion, research, and writing.

**HIST 521. Public History. 3 Credits.**
This course exposes students to the practice of public history through readings, discussion and practice. Repeatable to 6 credits. Repeatable to 6 credits.

**HIST 551. Seminar in the Teaching of History. 3 Credits.**
Required of all students pursuing the Doctor of Philosophy and Doctor of Arts. Includes methods appropriate to college-level teaching. Class consists of discussion, demonstration, and practice. S.

**HIST 585. Directed Readings. 3 Credits.**
Independent, directed readings on a topic tailored to the individual needs of the student. Doctoral students may repeat this course to a maximum of 6 credits; Masters students may not repeat the course. Prerequisite: Graduate status.

**HIST 592. Readings in World History. 3 Credits.**
This course focuses upon the reading and understanding of World History historiography, theories and methods through thematic and comparative readings. Repeatable. Repeatable.
HIST 593. Readings in American History. 2-3 Credits.
Topics vary. Involves reading, bibliographical study, discussion, and writing. Study may be confined to a subtopic within the general subject area. Repeatable with different subtopics. Students in the M.A. program with a U.S. primary concentration will not ordinarily take more than one 593.. Repeatable to 30 credits.

HIST 594. Readings in European History. 2-3 Credits.
Topics vary. Involves reading, bibliographical study, discussion, and writing. Study may be confined to a subtopic within the general subject area. Repeatable with different subtopics. Students in the M.A. program with a European primary concentration will not ordinarily take more than one 594.. Repeatable to 36 credits.

HIST 595. Research. 1-6 Credits.
Requires a research project that will be a component of the area of concentration. Repeatable to 12 credits. Prerequisite: Candidates for the Doctor of Arts only. Repeatable to 12 credits.

HIST 599. Internship in the Teaching of History. 3 Credits.
The internship requires the teaching of three courses to demonstrate proficiency in college-level teaching at the undergraduate level. Although the teaching is supervised, the student has full responsibility for the courses. The internship may be conducted on this campus or, with proper arrangement and supervision, on another campus. May be repeated to a maximum of nine credits. Prerequisite: Candidates for the Doctor of Arts only. Repeatable to 9 credits. S/U grading.

HIST 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

HIST 997. Independent Study. 2 Credits.

HIST 998. Thesis. 1-6 Credits.
Repeatable to 6 credits.

HIST 999. Dissertation. 3-24 Credits.
Repeatable to 24 credits.

Undergraduate Courses for Graduate Credit

HIST 344. Ancient Rome. 3 Credits.
A survey of the prehistory, historical development, and ultimate decline in Rome. In addition to inquiries into the military, political, cultural, economic, and religious experiences of the ancient Romans, this course will attempt to delineate those qualities of life that were peculiarly Roman. S, even years.

HIST 405. The United States: Age of Jefferson and Jackson, 1789-1850. 3 Credits.
A study of the creation of a new, expansive nationalism in the development of new institutions and new national character, and the simultaneous growth of sectional forces which brought the new nation to the brink of Civil War. F, even years.

HIST 406. The United States: Civil War and Reconstruction, 1850-1877. 3 Credits.
A study of the acceleration of the forces of sectionalism and racism that caused the temporary breakdown of the American democratic process and the tragedy of Civil War and Reconstruction. S, odd years.

HIST 407. The United States: Rise of Industrial America, 1877-1917. 3 Credits.
A survey of the rise of America to industrial and world power. Emphasis is placed upon the great changes which the Industrial Revolution brought and the American response to these changes. Detailed attention is given to the Populist and Progressive movements. F, odd years.

HIST 408. The United States, 1920-1945. 3 Credits.
A study of American society from the end of World War I through World War II. Emphasis will be placed upon the Republican ascendancy and social changes during the 1920s, the causes of the Great Depression, the New Deal, the road to World War II, and the war, especially the homefront. F, odd years.

HIST 412. U.S. Foreign Relations since 1900. 3 Credits.
An advanced survey of the major policies advocated and pursued by the U.S. during the 20th century. S, odd years.

HIST 413. The United States since 1945. 3 Credits.
An advanced examination of the United States as it has developed from the height of its power, influence, and prosperity through years of upheaval, cultural and political transformation, and economic decline. F, even years.

HIST 419. Great Britain since 1815. 3 Credits.
A survey of British history since 1815 with an emphasis on the state of mind known as "Victorian," as it was manifested, practiced, or criticized in the nineteenth century; its influence on economics, politics, foreign affairs, and social policy; and its vestiges in modern-day Britain. F, even years.

HIST 431. Seminar in the History of the Great Plains. 3 Credits.
This course promotes focused study of the Great Plains of North America through reading, discussion, research, and writing. Students will examine all aspects of Great Plains history including culture, environment, social organization, economics, and politics from the ancient past to the present. S, odd years.

HIST 470. United States-Canadian Relations, 1776 to the Present. 3 Credits.
This course explores the historical relationships linking and dividing Canada and the United States of America since 1774. Because of the unique constitutional and diplomatic status of British North America and then Canada itself, this course examines the often complex tri-partite relationship between the U.S., Canada, and Great Britain. F, even years.

HIST 480. Introduction to Public History. 3 Credits.
An introduction to public history at federal, state, and local levels. Emphasis is given to archival theory, oral history, museum studies and historic preservation, with attention to awareness of historical resources. On demand.

HIST 481. Public History Practice. 3 Credits.
A practicum in which the student learns through experience the techniques of public history work. S, odd years.

Doctor of Arts in History

Admission Requirements
The applicant must meet the School of Graduate Studies's current minimum general admission requirements as published in the graduate catalog.

1. All M.A. admission requirements.
2. A master's degree, preferably in history and with thesis, but at least 15 semester credits of history at the graduate level.
3. A GPA of at least 3.50 for the master's level work.
4. Satisfy the School of Graduate Studies' English Language Proficiency requirements as published in the graduate catalog.
5. Preference will be given to applicants with teaching experience, especially in the fields of history, the social sciences, or the humanities.
6. To insure full consideration of applications, especially for tuition waivers and graduate teaching assistantships, the application deadline for Fall admission is March 15 and for Spring admission it is September 30. Later applications will be considered.

Degree Requirements
Students seeking the Doctor of Arts degree at the University of North Dakota must satisfy all general requirements of the School of Graduate Studies as well as specific requirements of the History Department.

1. Completion of 90 semester credits beyond the baccalaureate degree, including acceptable master's work.
2. The following coursework:

   HIST 501  Methods of Historical Research  3
   HIST 502  Historiography  3
   HIST 551  Seminar in the Teaching of History  3
   Select one of the following (research seminar):
   HIST 511  Research Seminar in American History  3
   HIST 513  Research Seminar in World History  3
   HIST 515  Research Seminar in European History  3
   Select two of the following (reading courses):
   HIST 592  Readings in World History  6
   HIST 593  Readings in American History  3
   HIST 594  Readings in European History  3

Total Credits: 18
3. An area of concentration in one of the following fields: U.S. History to 1877, U.S. History since 1877, Pre-Modern European/Mediterranean History to 1750, Modern European History, World History. The concentration will include:
   a. 12 elective graduate credits in the field of concentration.
   b. HIST 595 Research (12 credits). An independent research project exploring a topic of significant concern to historians and teachers of history.

4. The following coursework:
   - T&L 539 College Teaching 3
   - Select one of the following: 3
     - PSYC 501 Psychological Foundations Educ
     - T&L 544 Assessment in Higher Education
     - T&L 545 Adult Learners
     - T&L 547 Technology in Higher Education
   - Total Credits 6

5. HIST 599 Internship in the Teaching of History (9 credits): Students will generally assist and co-teach a 100 level course survey with an experienced faculty mentor in the first semester of the internship; in two following semesters the student will teach two of the following independently:
   - HIST 101 Western Civilization I 3
   - HIST 102 Western Civilization II 3
   - HIST 103 United States to 1877 3
   - HIST 104 United States since 1877 3
   - HIST 105 World Civilizations I 3
   - HIST 106 World Civilizations II 3

6. Written examinations in both United States fields and in two of the three European fields selected on the basis of work done in a Master’s degree program as well as the doctoral program. (Exams may be taken after 60 hours of the program of study have been completed.)

Doctor of Philosophy in History Combined Program with NDSU

Admission Requirements

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. Preference for admission into the Ph.D. program with full graduate standing will be given to applicants who have a GPA of at least 3.5 in history courses in an earned bachelor’s or master’s degree.
2. Applicants will submit a statement of intent clearly outlining the applicant’s research interests, career goals, and purpose for seeking a Ph.D. in history.
3. Applicants will submit a substantial paper previously submitted for a class in history to provide evidence of ability to research thoroughly, to interpret and analyze primary and secondary sources, to synthesize information, to organize thoughts logically, and to communicate clearly and effectively.
4. Scores on the Graduate Record Examination are required.
5. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

Degree Requirements

Students seeking the Doctor of Philosophy degree at the University of North Dakota must satisfy all general requirements of the School of Graduate Studies as well as specific requirements of the History Department.

1. Students must satisfactorily complete 90 credits beyond the bachelor’s degree. Students entering with an M.A. degree must complete at least 60 additional semester graduate credits. Core course requirements must be met which include: Methods of Historical Research, Historiography, Seminar in the Teaching of History, at least two research seminars, and at least two readings courses. Students must complete 36 course credits with at least 27 credits in history courses. Students will earn 12 credits in two or more major fields. Students may choose a third major field or a minor field (nine semester credits).
2. Students must have a proficiency in two languages other than their native language or one foreign language and one special research skill such as statistics or computer science.
3. The program will require at least one academic year in residence at either campus. Each student will register at one of the universities that will be the student’s academic “home.” The student’s adviser must be employed in the home university. At least one member of the student’s committee must be employed at the other (not home) university. Students may have to take courses at both universities.
4. Students will write three comprehensive examinations in their major and minor fields. The exams will be evaluated and graded by the supervisory committee. Students will complete an oral examination based on the written exams. The oral examination is to be conducted by the supervisory committee.
5. Students will write a dissertation (up to 24 credits) on an approved topic in consultation with the faculty adviser and the supervisory committee of five faculty. The dissertation must be based on extensive research in primary and secondary sources, must argue an original thesis, and must be defended before the supervisory committee.

Residency Requirements

1. Students enrolled in the Ph.D. program are required to complete at least one academic year (18 credits minimum) in residence at one campus.
2. Resident students may qualify for teaching assistantships. Students who have completed a M.A. degree may be assigned full responsibility for undergraduate courses or may be assigned to assist a faculty member in teaching courses.
3. Students will be required to take some courses from faculty at both campuses, but will register at only one university. Some courses will be offered by interactive video network, some will be offered through internet online systems, some courses will require students to travel to the other campus.
4. Students not residing on one of the cooperating campuses will have to have access to a satisfactory research library for various courses and for dissertation research.

Courses

‡ All 593 and 594 courses involve reading, bibliographical study, discussion, and writing. Study may be confined to a subtopic within the general subject area. Repeatable with different subtopics. Students in the M.A. program will not ordinarily take more than one 593 or 594 in the primary concentration.

The following undergraduate courses are eligible for inclusion on graduate programs of study. Additional assignments and higher standards of accomplishment are required of students taking these courses for graduate credit.

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>HIST 344</td>
<td>Ancient Rome</td>
<td>3</td>
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<tr>
<td>HIST 405</td>
<td>The United States: Age of Jefferson and Jackson, 1789-1850</td>
<td>3</td>
</tr>
<tr>
<td>HIST 406</td>
<td>The United States: Civil War and Reconstruction, 1850-1877</td>
<td>3</td>
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<tr>
<td>HIST 407</td>
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<td>HIST 408</td>
<td>The United States, 1920-1945</td>
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<td>HIST 412</td>
<td>U.S.Foreign Relations since 1900</td>
<td>3</td>
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<td>HIST 413</td>
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<td>HIST 419</td>
<td>Great Britain since 1815</td>
<td>3</td>
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<tr>
<td>HIST 431</td>
<td>Seminar in the History of the Great Plains</td>
<td>3</td>
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</tbody>
</table>
Master of Arts in History

Admission Requirements

The applicant must meet the Graduate School’s current minimum general admission requirements as published in the graduate catalog.

1. Demonstration of preparation for graduate study in history. This includes one of the following from a recognized college or university:
   a. A bachelor’s degree in history, or
   b. An undergraduate degree with a minimum of 20 semester credits in history with at least 6 credits at the upper division level, or
   c. An undergraduate degree or combination of classes clearly demonstrating the applicant’s ability to pursue graduate study in history.
2. An overall undergraduate GPA of at least 3.00 and at least 3.25 in all undergraduate history courses.
3. A writing sample, preferably a research or seminar paper, that demonstrates the applicant’s research, analytical and writing skills.
4. Three letters of recommendation with at least two coming from individuals who hold or have held academic positions and who can comment on the applicant’s aptitude for graduate work.
5. A one-to-two page statement that explains the applicant’s interest in history, the reason for applying to the UND graduate program, and the area or areas in which the applicant intends to take courses and conduct research.
6. The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.
7. To insure full consideration of applications, especially for tuition waivers and graduate teaching assistantships, the application deadline for Fall admission is March 15 and for Spring admission, it is September 30. Later applications will be considered.

Degree Requirements

Students seeking the Master of Arts degree at the University of North Dakota must satisfy all general requirements of the School of Graduate Studies as well as requirements of the History Department.

Thesis Option

1. The M.A. degree (thesis option) requires a minimum of 30 credit hours.
2. In consultation with a designated advisor, the student will select a supervisory committee and prepare a program of study that provides the student with the academic tools necessary for advanced scholarly research, responds to the student’s academic and professional interests and goals, and fulfills all degree requirements. At the discretion of the student’s advisor, this program may require demonstrable proficiency in a foreign language and may include a minor or cognate.
3. The following coursework is required:

   - HIST 501 Methods of Historical Research 3
   - HIST 502 Historiography 3
   - Select one of the following (research seminar):
     - HIST 511 Research Seminar in American History
     - HIST 513 Research Seminar in World History
     - HIST 515 Research Seminar in European History
   - Select two of the following (reading courses):
     - HIST 592 Readings in World History
     - HIST 593 Readings in American History
     - HIST 594 Readings in European History
   - Electives 9
   - HIST 998 Thesis 6
   - Total Credits 30

4. The candidate will successfully complete, defend and submit to the School of Graduate Studies a thesis that meets the History Department’s established guidelines.

Non-Thesis Option

1. The M.A. degree (non-thesis option) requires a total of 35 credit hours.
2. In consultation with a designated advisor, the student will select a supervisory committee and prepare a program of study that provides the student with the academic tools necessary for advanced scholarly research, responds to the student’s academic and professional interests and goals, and fulfills all degree requirements. At the discretion of the student’s advisor, this program may require demonstrable proficiency in a foreign language, and may include a minor or cognate.
3. The following coursework is required:

   - HIST 501 Methods of Historical Research 3
   - HIST 502 Historiography 3
   - Select two of the following (research seminar):
     - HIST 511 Research Seminar in American History
     - HIST 513 Research Seminar in World History
     - HIST 515 Research Seminar in European History
   - Select two of the following (reading courses):
     - HIST 592 Readings in World History
     - HIST 593 Readings in American History
     - HIST 594 Readings in European History
   - Electives 15
   - HIST 997 Independent Study (see #4 below) 2
   - Total Credits 35

   * With the approval of the student’s advisor, up to twelve of these credits may be taken within the minor or cognate.

4. The candidate will successfully complete a scholarly independent investigation of a topic chosen in consultation with the advisor and members of the supervisory committee.
5. The candidate will successfully complete a comprehensive written examination administered by the advisor and supervisory committee, responding to the student’s program of study.

Kinesiology and Public Health Education

M.S. in Kinesiology (p. 468)

Courses

KIN 501. Introduction to Research in Kinesiology. 4 Credits.
The study of quantitative and qualitative research methods used in the field of kinesiology.

KIN 502. Evaluation in Kinesiology. 3 Credits.
The course will deal with the determination of standards for human performance in kinesiology, and the principles to apply these standards for exercise prescription.

KIN 511. Theory and Practice in Administration. 2 Credits.
A study of the knowledge, skills and insights as they relate to planning, management and leadership necessary for effective administration of programs. Prerequisite: KIN 341 or consent of instructor.

KIN 512. Theory and Practice in Sports Administration. 2 Credits.
Problems, policies and facilities in athletic departments with emphasis at the secondary level. Public relations problems met and problems of interrelationships with the general curriculum.

KIN 513. Supervision of Teaching and Coaching in Sports and Fitness Education. 3 Credits.
The study of the knowledge and skills necessary to supervise teaching and coaching in sport and fitness education. Prerequisite: KIN 521 or consent of instructor.
KIN 514. Theory and Practice in Intramural Sports Administration. 2 Credits.
The study of the basic ingredients required to administer a successful intramural program.

KIN 520. Curriculum Development for Physical Education. 3 Credits.
A study of processes for planning, implementing, and evaluating curriculum in physical education.

KIN 521. Analysis of Teaching and Coaching. 3 Credits.
A review of the knowledge and skills for instruction of physical activity and sports, with practical applications to teaching and coaching.

KIN 523. Historical and Philosophical Foundations. 2 Credits.
Educational justification of various phases of the kinesiology based on historical and philosophical evidence.

KIN 524. Adapted Activities. 3 Credits.
Theory and practice of modified activities adapted to needs, capacities and abilities of the atypical child. Prerequisite: KIN 404 or consent of instructor.

KIN 525. Motor Development. 3 Credits.
Study of age-related performance changes across the life span. Emphasis will be on physical and mental change as they affect motor skill acquisition and performance. Prerequisite: KIN 276 or KIN 355 or consent of instructor.

KIN 526. Introduction to Kinesiology Statistics. 3 Credits.
Understanding, interpreting, and reporting results of basic statistical analyses (descriptive and inferential, up to and including factorial and repeated measures ANOVAs) used in kinesiology research. Prerequisite: Kinesiology major or consent of instructor.

KIN 529. Exercise Psychology. 3 Credits.
A research-based study of the psychological aspects that are associated with participation in exercise/physical activity. Prerequisite: KIN 440 or consent of instructor.

KIN 530. Sports Biomechanics. 3 Credits.
The application of principles of mechanics to the study of human motion. F., even years.

KIN 531. Sport Psychology. 3 Credits.
A research-based study of the psychological aspects associated with participation in sport. Prerequisite: KIN 440 or consent of instructor.

KIN 532. Strength and Power Testing Techniques and Programming. 3 Credits.
Focuses on laboratory and field tests common in strength and power assessment. Prerequisite: KIN 402. F.

KIN 533. Motor Learning and Control. 3 Credits.
Study of the acquisition and control of human motor skill. Prerequisite: KIN 276 or equivalent consent of instructor.

KIN 534. Sport Sociology. 3 Credits.
This course is designed to examine various sociological factors in American society and their relationship to the sport experience. Prerequisite: KIN 401 or consent of instructor.

KIN 535. Advanced Exercise Physiology I. 3 Credits.
The focus of this course is on the mechanisms which affect the cardiovascular and pulmonary system responses at rest, during and after exercise. Prerequisites: KIN 402 or equivalent and consent of instructor.

KIN 536. Bioenergetics and Skeletal Muscle Function. 3 Credits.
Focuses on acute and chronic muscle function, energy metabolism, and regulatory process of skeletal muscle and muscle cell function during rest, during exercise and during recovery. Prerequisites: KIN 402 or equivalent, and consent of instructor. F.

KIN 537. Applied Sport Psychology. 3 Credits.
A study of psychological skill training programs for use with team and individual sports athletes. Prerequisite: KIN 440 or consent of instructor.

KIN 538. Exercise in Health and Disease. 3 Credits.
The role of exercise in the prevention and rehabilitation of individuals in various disease states (e.g., atherosclerosis, chronic obstructive lung disease, hypertension, diabetes, osteoporosis, obesity, and others) and health states (e.g., aging and pregnancy). This is a lecture course. Prerequisite: KIN 535 or consent of the instructor.

KIN 539. Ex Phys Lab: Anthropometry and Body Composition. 3 Credits.
Designed to develop practical and hands-on skills in anthropometry (the science of measuring body size, shape and composition) for apparently healthy individuals of all ages. Prerequisite: Consent of instructor. S.

KIN 540. Teaching Lifetime Fitness. 3 Credits.
A study of the philosophical, disciplinary, and professional considerations that are necessary for the optimal planning and execution of lifetime fitness/wellness education programs in public schools and allied settings.

KIN 541. Exercise Program Design. 3 Credits.
Focuses on designing scientifically sound aerobic, strength and conditioning, and resistance training programs for healthy adults. Intended for students planning on coaching, strength conditioning coaching, personal training, corporate fitness, exercise physiology, law enforcement, military, athletic training, or the allied health professions (physical therapy, etc.). S.

KIN 555. Special Topics in Kinesiology. 1-4 Credits.
Investigation of special topics in the study of kinesiology not included in current departmental course offerings. Repeatable when topics differ. Repeatable.

KIN 560. Seminar in Kinesiology. 1 Credit.
Presentations of current topics based on reviews of literature. Repeatable to 4 credits. Prerequisite: Consent of instructor. Repeatable to 4 credits. S/U grading.

KIN 561. Critical Synthesis and Analysis in Kinesiology. 2 Credits.
This course is designed to provide the student with the opportunity to critically analyze and synthesize selected topics in kinesiology. Prerequisite: 20 hours of graduate credit.

KIN 585. Internship in Kinesiology. 3-6 Credits.
Professional experience and skill development through supervised placement at an approved work site (or other program) relevant to the course of study. Repeatable to 6 credits. Prerequisites: Appropriate foundational and major area coursework and consent of advisor and on-site supervisor. Repeatable to 6 credits.

KIN 590. Individual Research in Kinesiology. 1-4 Credits.
Library, laboratory or field research of an approved project in Kinesiology. Repeatable to 4 credits. Prerequisites: KIN 501 and consent of the student's faculty advisor. Repeatable to 4 credits.

KIN 592. Directed Readings in Kinesiology. 2-3 Credits.
Extensive readings to cover a student's area of specialization and interest; written reports are required (may be repeated to a total of six credits). Prerequisites: KIN 501 and consent of the student's faculty advisor. Repeatable to 6 credits.

KIN 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

KIN 997. Independent Study. 2 Credits.
KIN 998. Thesis. 1-9 Credits.
Repeatable. S/U grading. Written reports are required (may be repeated to a total of six credits).

KIN 501. Teaching Lifetime Fitness. 3 Credits.
A study of the philosophical, disciplinary, and professional considerations that are necessary for the optimal planning and execution of lifetime fitness/wellness education programs in public schools and allied settings.

KIN 541. Exercise Program Design. 3 Credits.
Focuses on designing scientifically sound aerobic, strength and conditioning, and resistance training programs for healthy adults. Intended for students planning on coaching, strength conditioning coaching, personal training, corporate fitness, exercise physiology, law enforcement, military, athletic training, or the allied health professions (physical therapy, etc.). S.

KIN 555. Special Topics in Kinesiology. 1-4 Credits.
Investigation of special topics in the study of kinesiology not included in current departmental course offerings. Repeatable when topics differ. Repeatable.

KIN 560. Seminar in Kinesiology. 1 Credit.
Presentations of current topics based on reviews of literature. Repeatable to 4 credits. Prerequisite: Consent of instructor. Repeatable to 4 credits. S/U grading.

KIN 561. Critical Synthesis and Analysis in Kinesiology. 2 Credits.
This course is designed to provide the student with the opportunity to critically analyze and synthesize selected topics in kinesiology. Prerequisite: 20 hours of graduate credit.

KIN 585. Internship in Kinesiology. 3-6 Credits.
Professional experience and skill development through supervised placement at an approved work site (or other program) relevant to the course of study. Repeatable to 6 credits. Prerequisites: Appropriate foundational and major area coursework and consent of advisor and on-site supervisor. Repeatable to 6 credits.

KIN 590. Individual Research in Kinesiology. 1-4 Credits.
Library, laboratory or field research of an approved project in Kinesiology. Repeatable to 4 credits. Prerequisites: KIN 501 and consent of the student's faculty advisor. Repeatable to 4 credits.

KIN 592. Directed Readings in Kinesiology. 2-3 Credits.
Extensive readings to cover a student's area of specialization and interest; written reports are required (may be repeated to a total of six credits). Prerequisites: KIN 501 and consent of the student's faculty advisor. Repeatable to 6 credits.

KIN 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

KIN 997. Independent Study. 2 Credits.
KIN 998. Thesis. 1-9 Credits.
Minimum of 4 credits for thesis option. Repeatable to 9 credits. F.S.SS.

Master of Science in Kinesiology

Admission Requirements
Applicants who are seeking admission to the Kinesiology program in School of Graduate Studies must:

1. Meet all of the minimum general School of Graduate Studies admission requirements identified in the graduate catalog;
2. Include a personal statement of research interests and professional goals, which will be used to evaluate the potential for success in the graduate program and the adequacy and appropriateness of undergraduate/professional preparation.

Degree Requirements
Students seeking the Master of Science degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Kinesiology Graduate Program.

Thesis Option (minimum 30 credits):
1. Completion of 20 credits from Kinesiology.
2. Completion of graduate level courses in research methods and statistics (minimum of 6 credits).
3. Completion of KIN 560 every semester (repeatable for 1-4 credits).
4. Establish the Faculty Advisory Committee and submit the Program of Study by the completion of nine graduate credits.
5. Complete thesis (KIN 998, 6-9 credits).

Non-Thesis Option (minimum 32 credits):
1. Completion of 20 credits from Kinesiology.
2. Completion of graduate level courses in research methods and statistics (minimum of 6 credits).
3. Completion of KIN 560 every semester (repeatable for 1-4 credits).
4. Select permanent advisor and submit the Program of Study by the completion of nine graduate credits.
5. Complete independent study (KIN 997, 2 credits)
6. Pass final comprehensive examination.

Linguistics

M.A. in Linguistics (p. 471)

Certificate in Community-Based Literacy as Applied Linguistics (p. 470)

Courses

LING 502. Acoustic Phonetics. 3 Credits.
This course focuses on the instrumental study of the acoustic properties of speech sounds, speech analysis, experimental techniques, and laboratory work. By the end of the course, students should be confident in their abilities to plan, carry out and analyze the results of experiments in phonetics; and to relate acoustic phonetic data to their linguistic analyses. Basic techniques in experimental phonetics such as recording, annotation, fundamental frequency analysis, formant frequency analysis, and spectrographic analysis will be studied. Prerequisite: LING 450. Prerequisite or Corequisite: LING 451.

LING 503. Phonology II. 3 Credits.
Phonological phenomena examined from current theoretical frameworks; emphasis on creation and testing of hypotheses about the phonological systems of particular languages. The particular theoretical orientation varies depending on the instructor; often, more than one framework is used. The course assumes basic knowledge of rule-based generative phonology. Prerequisites: LING 450 and LING 451, or equivalents.

LING 504. Syntax II. 3 Credits.
Drawing on one or more theories from the generative tradition, this course explores syntactic forms that are commonly attested in human language. There is emphasis on the role of language universals and linguistic argumentation in arriving at analyses of language phenomena. Prerequisite: LING 452.

LING 505. Typology and Discourse. 3 Credits.
The course covers recent trends relating to language typology and cross-linguistic generalizations, focusing on the domains of morphosyntax, semantics and pragmatics. Prerequisite: LING 452.

LING 506. Field Methods. 3 Credits.
Practical aspects of linguistic field work and analysis, including an intensive practicum with speakers of a non-Western language for the purposes of developing skill in data collection, data management (using some computational tools), and the analysis and description of the phonological, grammatical and lexical structures of human languages. Prerequisites: LING 450 or LING 455 or equivalent and LING 452 or equivalent; recommended prerequisite LING 480. Prerequisite or corequisite: LING 451 or LING 516 or equivalent; LING 508L or equivalent. SS.

LING 506L. Media Technology for Linguistic Research. 1 Credit.
Specialized hardware and software tools for linguistic research on spoken or signed languages (recording, analyzing, and presenting data), with focus on digital images, audio and video, as well as transcription and annotation tools for text analysis. Each student focuses on tools for either signed or spoken languages, with separate sections for each; the class may be retaken for credit if the focus is different. Intended to be taken alongside LING 506 Field Methods, but can also be taken independently, as it is also useful in preparation for several other courses, such as Acoustic Phonetics, Sign Language Phonology, Sign Language Morphosyntax, and for a thesis that involves language data collection or language documentation. Repeatable to a maximum of 2 credits. SS.

LING 507. Special Topics in Linguistics. 1-4 Credits.
Topics of current interest in linguistics. May be repeated if topic is different. Repeatable.

LING 510. Semantics and Pragmatics. 3 Credits.
Various dimensions of meaning on the lexical, propositional, and interpropositional levels. Meaning is studied both as a property of linguistic expressions and as derived from contextual factors. Topics include principles of lexicography, selection restrictions, operators and their scope, illocutionary force, inference, and relations between form and meaning. Prerequisite: LING 452 or equivalent.

LING 511. Translation of Texts: Theory and Practice. 3 Credits.
This course is an introduction to the theory and practice of text translation, emphasizing the accurate, natural and clear transference of meaning across languages and cultures. Current issues in translation theory will be discussed, especially the approach based on Relevance Theory. Practical aspects of the course will include recognizing common translation problems and solutions, maintaining quality control, the role of computation, program planning aspects of translation projects or activities and teaching others to translate. Prerequisites: LING 452 and two years of foreign language or equivalent proficiency. Prerequisite or corequisite: LING 510. SS, even years.

LING 512. Sociolinguistic Methods in Language Survey. 3 Credits.
This course covers the principles of surveying, quantifying, and interpreting data on language attitudes, identity, bilingualism, intelligibility, vitality, language spread, shift, maintenance and death. Prerequisites or Corequisites: LING 450 and LING 470. SS, odd years.

LING 512L. Sociolinguistic Methods in Language Survey. 1 Credit.
This course is an optional lab to be taken alongside LING 512, enabling potential language surveyors to learn some of the core procedures that are recommended to achieve common survey objectives. Prerequisites or Corequisites: LING 450 and LING 470. SS, odd years.

LING 513. Tone Analysis. 3 Credits.
Analysis of tone systems in the world's spoken languages, covering a comprehensive variety of common tonal phenomena and tone systems. Methodology for analyzing a tonal language, so as to clearly and accurately describe its particular tone system. Implications of tone analysis for orthography development. Prerequisites: LING 450, LING 451 and LING 452. SS.

LING 516. Phonology of Signed Languages. 2-3 Credits.
How the basic phonetic elements in a natural signed language function together in the phonological system of the language. Practice in the application of various theoretical frameworks to problem solving and analysis of specific signed languages, and in applying theoretical concepts of general phonology to signed language research. Prerequisites: Proficiency in a natural signed language equivalent to at least one year of college-level study. Prerequisite or Corequisite: LING 455. SS.

LING 519. Introduction to Literacy Principles. 3 Credits.
Introduction to literacy principles, methods, materials and programs in multilingual societies, especially those involving one or more minority languages. Includes language policy and planning, reading theory, materials design, and literacy program design and implementation, with special emphasis on training and assisting members of the minority language community to establish and maintain ongoing literacy programs. Intended as an introduction to the topic for literacy technicians who will be assisting in literacy programs under the direction of experienced literacy specialists, or for field linguists who are not planning to be literacy specialists. Content is similar to the package of courses 520/521/522, but in less depth; it may be taught with some class sessions in common with the larger package. Corequisite: LING 530 is recommended. Prerequisite or Corequisite: LING 470. SS.

LING 520. Foundational Issues of Community-based Literacy in Multilingual Societies. 3 Credits.
Upon completion of this course, students will be able to: (a) explain in detail the inter-relationship between illiteracy, poverty, politics and environment; (b) identify and describe the major movements and trends in literacy; (c) explain and teach the principles of adult education; (d) identify the major “players” in the field of adult literacy; (e) explain the major issues involved in developing a multilingual education program for school children. Corequisites: LING 521 and LING 522. SS, odd years.
LING 521. Literacy Program Planning and Management. 3 Credits.
Upon completion of this course, students will be able to: (a) explain, with examples, change processes in traditional communities; (b) design a complete literacy program; (c) explain alternative strategies for designing and managing a literacy program; (d) evaluate the need for external funding in a literacy program; (e) do detailed costing for a literacy program; (f) write a funding proposal for a literacy program; and (g) use the LinguaLinks Electronic Performance Support system and access relevant Internet resources. Corequisites: LING 520 and LING 522. SS, odd years.

LING 522. Materials and Methods in Adult Literacy. 3 Credits.
Upon completion of this course, students will be able to: (a) explain some of the major theories of reading and the history of their evolution; (b) explain, describe, and critique various instructional strategies for teaching reading; (c) design instructional materials from any one of five different strategies for teaching reading; (d) design teacher training protocols for literacy programs; (e) design testing protocols for reading materials; (f) develop instructional materials for transitional literacy programs; (g) organize and direct a writers’ workshop; and (h) explain the need for postliteracy materials and how to develop these. Corequisites: LING 520 and LING 521. SS, odd years.

LING 526. Morphosyntax of Signed Languages. 2-3 Credits.
Reasons for considering signed languages as natural languages. Morphological and syntactic properties that are characteristic of signed languages and which distinguish them from spoken languages, with briefer mention of semantics and discourse. Specific issues important to the analysis of signed languages, including: glossing conventions, grammaticalization of space, deixis and agreement, lexical structure, lexicalized borrowing, verb classes, aspect, classifiers, iconicity and metaphor, nonmanuals, and information structure. Prerequisite: LING 452 and proficiency in a natural signed language equivalent to at least one year of college-level study. SS.

LING 530. Introduction to Writing Systems. 1 Credit.
Introduction to the principles of designing and testing a writing system for a spoken or signed language. Attention is given to linguistic, sociolinguistic, educational, psycholinguistic, political/ideological, production and implementation issues in orthographic development. Prerequisite or corequisite: Either a) prerequisite LING 470 and corequisite LING 451; b) prerequisite LING 470 and corequisite LING 516; or c) corequisites LING 520, LING 521 and LING 522. SS.

LING 534. Historical Linguistics. 3 Credits.
Discovery of historical relationships between languages with primary focus on the comparative method for identifying regular sound changes and reconstructing parent languages, as well as identifying contact-induced changes such as areal diffusion and borrowing. Some coverage of internal reconstruction and historical morphology/syntax. Historical linguistics has applications for language survey, language planning and development and adaptation of translated materials between related languages. Prerequisites: LING 451 and LING 470 or equivalents. SS.

LING 535. Ethnographic Methods in Field Linguistics. 3 Credits.
Major areas within cultural anthropology (social, political, economic, religious, etc.) particularly with respect to issues that affect how one conducts field linguistic research and language development projects in a cross-cultural context, and which emphasize the interrelatedness of language and culture. Methods of ethnographic field methods for collecting cultural data, including practical experience in applying those methods in a research project. Recommended to be taken at the same time as LING 506, Field Methods, because of the possibilities for integrated assignments between the two courses. Prerequisite: 6 credits in linguistics or consent of instructor.

LING 536. Language Documentation. 3 Credits.
Language documentation goes beyond collection of language data, analysis of that data, and language description based on that data. Successful language documentation results in a body of recordings and transcriptions that can be used by later researchers and community members interested in studying aspects of the language and culture that the original researcher had not even thought about. In a number of cases, it has provided the basis for revitalization of languages that were highly endangered or even dead. In this course you will learn the relationship between language documentation and language description. You will learn to perform the basic tasks of language and culture documentation, including planning, archiving, and managing the metadata associated with the corpus. The grade for the course will be based on projects that you design either individually or in groups. Prerequisite: An introductory course in linguistics. Prerequisite or Corequisite: LING 506L.

LING 580. Academic Writing in Linguistics. 1 Credit.
Instruction and practice in academic writing within the field of linguistics. All students will be required to submit a sample of their writing for peer review, and review fellow students’ writing. Prerequisite: Acceptance to the MA program in Linguistics or permission of the instructor. SS.

LING 590. Directed Studies in Linguistics. 1-4 Credits.
Supervised individual study. May be repeated if the topic is different. A maximum of 4 credits in LING 590 and 594 may be applied to the M.A. in linguistics. Repeatable to 4 credits.

LING 594. Research in Linguistics. 1-4 Credits.
Supervised individual research. May be repeated if topic is different. A maximum of 4 credits in LING 590 and 594 may be applied to the M.A. in linguistics. Repeatable to 4 credits.

LING 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

LING 998. Thesis. 1-9 Credits.
Repeatable to 9 credits.

Undergraduate Courses for Graduate Credit
LING 450. Articulatory Phonetics. 2 Credits.
Introduction to the theory and practice of articulatory phonetics. SS.
LING 451. Phonology I. 3 Credits.
Introduction to phonological analysis; intensive practice in applying theoretical principles to problem solving and to field techniques. Prerequisite: LING 450 or with permission of the instructor ENGL 209 as a prerequisite and LING 450 as a corequisite. SS.
LING 470. Introduction to Sociolinguistics and Language Development. 2 Credits.
Introduction to language variation as influenced by social interaction, with special attention to participatory language development in multilingual societies. SS.

Graduate Certificate in Community-Based Literacy as Applied Linguistics
The Graduate Certificate in Community-Based Literacy as Applied Linguistics, which is offered as part of UND’s Linguistics program, is intended to prepare students to promote literacy in other countries, particularly in multilingual societies and through non-traditional programs that are outside the formal educational system. Examples of such programs include those that address adult functional literacy (in health, agriculture, etc.), rights-based literacy, literacy in the local language first with transition to biliteracy in a national language or other language of wider communication, and transfer of literacy skills from a language of wider communication to literacy in the local language.

Mission Statement
To prepare students to organize, teach, manage and promote non-formal literacy programs in multilingual societies, particularly in developing countries, and to provide a graduate-level credential to people working in literacy in other countries where such a credential is often expected by governments and NGOs and can be very helpful for career advancement.

Admission Requirements
1. A four-year bachelor’s degree from a recognized college or university.
2. Either: a. one year of experience living and working in another country and culture; or b. a course in cultural anthropology or sociolinguistics at the 300-level or higher.
3. A GPA for all previous college-level work of 2.8 or better.

In addition, it is recommended that students have either a background in education or in linguistics (such as one summer at UND taking courses from SIL).
Certificate Requirements

1. The following courses:
   - LING 520  Foundation of Issues in Community-Based Literacy in Multilingual Societies 3
   - LING 521  Literacy Program Planning and Management 3
   - LING 522  Materials and Methods in Adult Literacy 3
   - LING 530  Introduction to Writing Systems 1

   Total Credits 10

   (Students must be accepted into the certificate program before enrolling in any of these courses.)

A maximum of nine credits from this graduate certificate may be used toward the M.A. in linguistics, if the student enrolls in the M.A. program after completing the certificate. No professional accreditation is associated with the certificate.

See more detailed information at: http://arts-sciences.und.edu/summer-institute-of-linguistics.

Master of Arts in Linguistics

Admission Requirements

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. A four-year bachelor’s degree from a recognized college or university.
2. A minimum of 20 semester credits in linguistics or related fields, e.g., foreign language, of which at least 10 credits must be in linguistics, and which must include the equivalent of LING 452 Syntax and Morphology I.
3. A cumulative Grade Point Average (GPA) of at least 2.8 for all undergraduate work or a GPA of at least 3.0 for the junior and senior years of undergraduate work (based on A= 4.00).
4. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.
5. Students deficient in prerequisite credits (see #2 above) should generally plan to take their first summer as non-degree graduate students. Up to nine credits taken as a non-degree graduate student can be applied to the M.A. Therefore, students who meet some, but not all, of the prerequisites can use some of the credits gained as non-degree graduate students to meet the prerequisites, and apply some to the M.A. Foreign language proficiency may be demonstrated by passing an examination in the language in lieu of formal credits.

Degree Requirements

Students seeking the Master of Arts degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Linguistics Program.

1. A minimum of 32 credits including:
   a. 3 credits listed in the Linguistics section of the graduate catalog in the area of phonetics/phonology
   b. 3 credits in Linguistics in syntax/semantics
   c. 3 credits in Linguistics in applied linguistics
   d. LING 580 Academic Writing in Linguistics
   e. 4 credits for a thesis
   f. At least 5 other credits in Linguistics

2. Of the remaining 13 credits, courses with linguistics content offered by other departments, such as English, may be counted as linguistics credits for the major.
3. Up to 4 credits of Directed Study and Research courses, e.g. LING 590 Directed Studies in Linguistics and LING 594 Research in Linguistics, may be used to supplement the standard graduate course offerings.
4. Nine credits may be in a minor or in cognate courses (see the Degree Requirements section of the graduate catalog.)
5. At least one-half of the credits must be at or above the 500-level.
6. Students normally satisfy the residency requirements by spending at least two summers enrolled in the program.
7. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.
8. The thesis will be based on the analysis of language data collected by the student or on theoretical or applied applications of data arising from language research.

See more detailed information at: http://arts-sciences.und.edu/summer-institute-of-linguistics.

Mathematics

M.S. with Major in Mathematics (p. 473)
M.Ed. with Major in Mathematics (p. 473)
Minor in Statistics (p. 473)

Courses

MATH 505. Seminar in Mathematics. 1-3 Credits. Repeatable.
MATH 512. Modern Analysis I. 3 Credits.
Algebras and o - algebras, Borel sets, measures, measurable sets and Lebesgue measure, non-measurable sets, measurable functions, the definition and basic properties of the Lebesgue integral, Fatou's lemma, the monotone convergence theorem, and Lebesgue's dominated convergence theorem. Prerequisite: MATH 432.
MATH 513. Modern Analysis II. 3 Credits.
Product measures, Fubini's theorem, the Radon Nikodym theorem, inequalities of Hölder and Minkowski, definitions and basic properties of normed spaces and Banach spaces, some classical Banach spaces such as Lp and Lp, bounded linear operators, and dual spaces. Prerequisite: MATH 512.
MATH 515. Applied Mathematics. 3 Credits.
The content of the course varies but includes current topics in applied mathematics such as: (1) ordinary or partial differential equations, (2) approximation theory and perturbation techniques, (3) modeling and computer simulation, (4) special functions, (5) numerical analysis, (6) variational methods, (7) transforms, (8) integral equations. Prerequisite: MATH 266 or consent of instructor.
MATH 516. Applied Mathematics. 3 Credits.
The content of the course varies but includes current topics in applied mathematics such as: (1) ordinary or partial differential equations, (2) approximation theory and perturbation techniques, (3) modeling and computer simulation, (4) special functions, (5) numerical analysis, (6) variational methods, (7) transforms, (8) integral equations. Prerequisite: MATH 266 or consent of instructor.
MATH 518. Algebra I. 3 Credits.
Group theory, rings and fields, vector spaces, Galois theory and finite fields. Prerequisites: MATH 441 and MATH 442.
MATH 519. Algebra II. 3 Credits.
Group theory, rings and fields, vector spaces, Galois theory and finite fields. Prerequisites: MATH 441 and MATH 442.
MATH 520. Topology I. 3 Credits.
Point set topology, including metric spaces and such topics as homeomorphisms, separation axioms, compactness, connectedness, general convergence, compactification and metrizability. Prerequisite: MATH 431.
MATH 521. Topology II. 3 Credits.
Point set topology, including metric spaces and such topics as homeomorphisms, separation axioms, compactness, connectedness, general convergence, compactification and metrizability. Prerequisite: MATH 431.
MATH 541. Linear Statistical Models. 3 Credits.
Distributions of quadratic forms, general linear hypotheses of full rank, least squares, Gauss-Markoff theorem, estimability, parametric transformations, Cochran's theorem, projection operators and conditional inverses in generalized least squares, applications to ANOVA and experimental design models. Prerequisite: MATH 422 or consent of instructor.
MATH 542. Advanced Topics in Statistics and Probability. 3 Credits.
The content of the course varies but may include (but is not restricted to)
current topics in statistics and probability such as (1) time series, (2) sampling,
(3) nonparametric statistics, (4) experimental design, (5) probability theory, (6)
statistical theory, (7) multivariate statistical analysis. Prerequisite: MATH 541 or
consent of instructor.

MATH 576. Algebra and Geometry for Middle School Teachers. 3 Credits.
Algebra and Geometry course intended for middle school teachers: a) planning
to qualify to teach middle school mathematics; or b) teachers looking to
enrich their content knowledge in mathematics. Topics may include: rational
number system, introduction to number theory, algebraic thinking, spatial
reasoning and representation, introduction to Euclidean and non-Euclidean
geometry, problem solving and pedagogical issues. May not be used in Ph.D.
or Master's programs. Prerequisites: Licensed K-12 teacher, College Algebra,
and instructor consent.

MATH 577. Calculus Concepts for Middle School Teachers. 3 Credits.
Calculus course intended for middle school teachers: a) planning to qualify
to teach middle school mathematics; or b) teachers looking to enrich their
content knowledge in mathematics. Topics may include: analysis of functions,
mathematical modeling, limits, continuity, differentiation, integration, and
pedagogical issues. May not be used in Ph.D. or Master's programs.
Prerequisites: Licensed K-12 teacher, College Algebra, and instructor consent.

MATH 578. Probability and Statistics for Middle School Teachers. 3 Credits.
Probability and statistics course intended for middle school teachers: a)
planning to qualify to teach middle school mathematics; or b) teachers looking to
enrich their content knowledge in mathematics. Topics may include:
counting, empirical and theoretical probabilities, simulation of probabilistic
events, conditional probability, expected value, data and variables, random
sampling, measures of central tendency and spread, least squares regression,
and pedagogical issues. May not be used in Ph.D. or Master's programs.
Prerequisites: Licensed K-12 teacher, College Algebra, and instructor consent.

MATH 579A. Practicum in Middle School Mathematics. 2 Credits.
Teachers will use their content and pedagogical knowledge to plan lesson(s)
and develop and implement an action research project in their school. May be
repeated for up to 6 credits. May not be used in Ph.D. or Master's programs.
Prerequisites: Licensed K-12 teacher, Math 276, 577 or 578 and instructor
consent. Repeatable to 6 credits.

MATH 579B. Practicum in Middle School Mathematics. 2 Credits.
Teachers will use their content and pedagogical knowledge to plan lesson(s)
and develop and implement an action research project in their school. May be
repeated for up to 6 credits. May not be used in Ph.D. or Master's programs.
Prerequisites: Licensed K-12 teacher, Math 276, 577 or 578 and instructor
consent.

MATH 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

MATH 997. Independent Study. 2 Credits.

MATH 998. Thesis. 1-9 Credits.
Repeatable to 9 credits.

Undergraduate Courses for Graduate Credit

MATH 405. Selected Topics in Mathematics. 1-3 Credits.
May be repeated to maximum of six credits. Prerequisite: Permission of the
Mathematics Department. Repeatable to 6 credits. On demand.

MATH 408. Combinatorics. 3 Credits.
Introduction to the techniques and reasoning needed in combinatorial problem-
solving. The course may include topics related to combinatorics, such as graph
theory. Prerequisites: MATH 166 and MATH 208. S, odd years.

MATH 409. Geometry. 3 Credits.
Metric and synthetic approach to Euclidean geometry. The usual topics in
elementary geometry treated in a mathematically logical way. Topics include
congruence, inequalities, parallelism, similarity, area, solid geometry and the
circle. Prerequisite: MATH 208 or MATH 330. F.

MATH 412. Differential Equations. 3 Credits.
Basic types of ordinary differential equations. Existence and uniqueness of
solutions. Prerequisite: MATH 266. S, even years.

MATH 415. Topics in Applied Mathematics. 1-3 Credits.
An introduction to selected areas in applied mathematics chosen from a variety
of topics including: Applied algebra, difference equations, linear programming,
modeling and simulation, operations research, optimization, partial differential
equations and computers in mathematics. Topics to be considered will be
illustrated with examples and practical applications. May be repeated for
credit with consent of instructor up to a maximum of six credits. Prerequisites:
MATH 265 and consent of instructor. Repeatable to 6 credits. On demand.

MATH 416. Topics in Statistics. 1-3 Credits.
An introduction to a variety of topics in statistics including: Linear models in
categorical analysis, Bayesian methods, decision theory, ridge regression, Non
parametric techniques, stochastic games and models. The number of topics to
be considered during a semester will be limited to permit greater depth of
coverage and sufficient practical illustrations. May be repeated for credit with
consent of instructor up to six credits. Prerequisites: MATH 265 and MATH 321
or consent of instructor. Repeatable to 6 credits. On demand.

MATH 421. Statistical Theory I. 3 Credits.
Discrete and continuous random variables, expectation, moments, moment
generating functions, properties of special distributions, introduction to
hypothesis testing, sampling distributions, Central Limit Theorem, curve of
regression, correlation, empirical regression by least squares, maximum
likelihood estimation, Neyman-Pearson lemma, likelihood ratio test, power
function, chi-square tests, change of variable, "t" and "F" tests, one and two-
way ANOVA, nonparametric methods. Prerequisite: MATH 265. F.

MATH 422. Statistical Theory II. 3 Credits.
Discrete and continuous random variables, expectation, moments, moment
generating functions, properties of special distributions, introduction to
hypothesis testing, sampling distributions, Central Limit Theorem, curve of
regression, correlation, empirical regression by least squares, maximum
likelihood estimation, Neyman-Pearson lemma, likelihood ratio test, power
function, chi-square tests, change of variable, "t" and "F" tests, one and two-
way ANOVA, nonparametric methods. Prerequisite: MATH 421. S.

MATH 431. Introduction to Analysis I. 3 Credits.
Development of the real number system, functions, sequences, limits,
continuity, and differentiation. Prerequisite: MATH 330 or consent of instructor.
F.

MATH 432. Introduction to Analysis II. 3 Credits.
A continuation of MATH 431. topics in the second semester include integration,
partial differentiation, infinite series, power series and vector analysis.
Prerequisite: MATH 431. S.

MATH 435. Theory of Numbers. 3 Credits.
Basic properties of numbers, including divisibility, primes, congruences,
Diophantine equations and residue theory. Prerequisite: MATH 208 or 330. S.

MATH 441. Abstract Algebra. 3 Credits.
Rings, integral domains, fields, elements of group theory. Prerequisite:
MATH 330 or consent of instructor. F.

MATH 442. Linear Algebra. 3 Credits.
A theoretical treatment of systems of linear equations, matrices, vector
spaces, linear transformations and elementary canonical forms. Prerequisites:
MATH 207 and MATH 330 or consent of instructor. S.

MATH 460. Mathematical Modeling. 3 Credits.
The primary goal of the course is to present the mathematical analysis provided
in scientific modeling. Topics may include population modeling, mechanical
vibrations, traffic flow, epidemic modeling, queues and decay processes.
Prerequisites: MATH 266 and MATH 207 or consent of instructor. On demand.

MATH 461. Numerical Analysis. 3 Credits.
Numerical techniques for: the solution of equations in one or several unknowns,
approximate integration, differential equations, approximation theory,
optimization theory and matrix analysis. Corresponding error analysis will be
investigated. Prerequisites: MATH 266 and a scientific programming language.
On demand.

MATH 471. Introduction to Complex Variables. 3 Credits.
The complex plane, analytic functions, complex integration, power series, the
theory of residues and contour integration, conformal mapping, Fourier and
Laplace transformations, and applications. Prerequisite: MATH 265. F, even
years.

MATH 494. Reading Course in Mathematics. 1-3 Credits.
Directed individual reading on selected topics not developed in other courses.
Repeatable to six credits. Prerequisites: Consent of instructor. Repeatable to 6
credits. F,S,SS.
Admission Requirements

Mathematics

Master of Science with Major in

general admission requirements as published in the graduate catalog. The applicant must meet the School of Graduate Studies' current minimum admission requirements as published in the graduate catalog.

Graduate Minor in Statistics

The requirements consist of 9 hours of which MATH 421 Statistical Theory I and MATH 422 Statistical Theory II are required if they were not taken as an undergraduate. The remaining credits may be selected from various probability and statistics-oriented courses in mathematics and other disciplines. For further information about this option, contact the chair of the Mathematics Department.

Master of Education in Mathematics

Admission Requirements

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. Satisfy the undergraduate requirements in Education, i.e., 18 credit hours in Education including student teaching.
2. The equivalent of a bachelor's degree with a major in mathematics.
3. A cumulative grade point average (GPA) of at least 2.75 for all undergraduate work or a GPA of at least 3.0 for the junior and senior years of undergraduate work (based on A=4.0).
4. Students who have not completed the equivalent of the following courses will be required to do so as part of their graduate program.
5. MATH 409 Geometry 3
   MATH 421 Statistical Theory I 3
   MATH 431 Introduction to Analysis I 3
   MATH 441 Abstract Algebra 3
   MATH 442 Linear Algebra 3

5. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

Degree Requirements

1. A minimum of 32 semester credits is required for the M.Ed. degree, including two credits for the independent study.
2. At least one-half of the credits must be at or above the 500-level.
3. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.
4. A minimum of 16 credits, including 2 for the independent study, in Mathematics with at least 8 credits at or above the 500 level as approved by the department.
5. A minimum of 6 credits in an area cognate to the area of concentration.
6. The courses T&L 569, EFR 500, T&L 580, MATH 505 Seminar: Methods and Materials for Secondary Mathematics will be required.
7. Preparation of a written independent study approved by the faculty advisor.
8. Comprehensive final exam.

Master of Science with Major in Mathematics

Admission Requirements

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. The equivalent of a bachelor's degree with a major in mathematics.
2. A cumulative grade point average (GPA) of at least 2.75 for all undergraduate work or a GPA of at least 3.0 for the junior and senior years of undergraduate work (based on A=4.0).

3. Students who have not completed the equivalent of MATH 431 Introduction to Real Analysis will be required to do so as part of their graduate program.
4. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog. Students without the required degree, or equivalent, may be admitted but will be required to satisfactorily complete undergraduate courses to make up their deficiency before advancement to Approved status.

Degree Requirements

Students seeking the Master of Science degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Mathematics Department.

Thesis Option

1. A minimum of 30 semester credits in a major field, including the credits granted for the thesis and the research leading to the thesis.
2. The program may include just the major, the major and a minor, or the major and a cognate area. The major must include 20 credits from the major department, and a minor or cognate area must include at least nine credits.
3. At least one-half of the credits must be at or above the 500-level.
4. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.
5. Comprehensive final examination.
6. Required Courses:

   Select two of the following sequences:  
   MATH 512 Modern Analysis I  
   & MATH 513 and Modern Analysis II  
   MATH 515 Applied Mathematics  
   & MATH 516 and Applied Mathematics  
   MATH 518 Algebra I  
   & MATH 519 and Algebra II  
   MATH 520 Topology I  
   & MATH 521 and Topology II  
   MATH 541 Linear Statistical Models  
   & MATH 542 and Advanced Topics in Statistics and Probability  
   At least one additional graduate level mathematics course 3  
   MATH 998 Thesis 4  
   Electives/Cognates 11  
   Total Credits 30

Non-Thesis Option

1. Thirty-two (32) credits including a minimum of two credits of MATH 997 Independent Study.
2. At least one-half of the credits must be at or above the 500-level.
3. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.
4. The program may include just the major, the major and a minor, or the major and a cognate area. The major must include 20 credits from the major department, and a minor or cognate area must include at least nine credits.
5. Preparation of a written independent study approved by the faculty advisor.
6. Comprehensive final examination.
7. Required Courses:

   Select two of the following sequences:  
   MATH 512 Modern Analysis I  
   & MATH 513 and Modern Analysis II  
   MATH 515 Applied Mathematics  
   & MATH 516 and Applied Mathematics  
   MATH 518 Algebra I  
   & MATH 519 and Algebra II  
   MATH 520 Topology I  
   & MATH 521 and Topology II  
   MATH 541 Linear Statistical Models  
   & MATH 542 and Advanced Topics in Statistics and Probability  
   Total Credits 12
At least one additional graduate level mathematics course 3
MATH 997 Independent Study 2
Electives/Cognates 15
Total Credits 32

Medical Laboratory Science
M.S. in Medical Laboratory Science (p. 475)

Courses

MLS 501. Advanced Laboratory Practice: Technical Concepts. 3 Credits.
An examination of technical concepts and skills utilized to ensure quality in the medical laboratory. The course will focus on enhancing quality control analysis and method validation skills, and utilizing statistical tools to monitor and improve quality testing processes in the medical laboratory. Offered once per 3-year cycle (fall or spring semester). See program website for current course rotation. Prerequisite: MLS program students only.

MLS 502. Advanced Clinical Hematology: Erythrocytes. 3 Credits.
A comprehensive study of human erythrocytes. Included are discussions of normal erythrocyte structure, function, production, regulation, and the pathophysiology of related disorders. The role of current laboratory testing in the diagnosis of erythrocyte disorders will be emphasized. Offered once per 3-year cycle (fall or spring semester). See program website for current course rotation. Prerequisite: MLS program students only. F.S.

MLS 503. Advanced Clinical Hematology: Leukocytes. 3 Credits.
A comprehensive study of human leukocytes. Included are discussions of normal leukocyte structure, function, production, regulation, and the pathophysiology of related disorders. The role of current laboratory testing in the diagnosis of leukocyte disorders will be emphasized. Offered once per 3-year cycle (fall or spring semester). See program website for current course rotation. Prerequisite: MLS program students only. F.S.

MLS 504. Advanced Laboratory Practice: Financial Management. 3 Credits.
This course presents an overview of financial management for medical laboratories. Students examine several basic financial operation concepts, including how to evaluate productivity, manage salaries, and manage supply inventories for maximum cost containment. Students learn how to plan for capital expenditures, set laboratory fee rates, and create, implement, and evaluate a budget. Offered once per 3-year cycle (fall or spring semester). See program website for current course rotation. Prerequisite: MLS program students only. F.S.

MLS 505. Advanced Clinical Chemistry. 3 Credits.
An advanced study of the theories and principles of clinical chemistry. Correlation of laboratory results with associated disease pathophysiology will be emphasized. Offered once per 3-year cycle (fall or spring semester). See program website for current course rotation. Prerequisite: MLS program students only. F.S.

MLS 506. Advanced Clinical Immunohematology. 3 Credits.
A detailed study of human blood groups including laboratory aspects of blood banking with special reference to theoretical and clinical applications. Emphasis will be placed on antibody identification and advanced problem solving techniques. Offered once per 3-year cycle (fall or spring semester). See program website for current course rotation. Prerequisite: MLS program students only. F.S.

MLS 507. Leadership for the Laboratory Professional. 3 Credits.
This course will focus on developing leadership skills applicable to the medical laboratory profession. Offered once per 3-year cycle (fall or spring semester). See program website for current course rotation. Prerequisite: MLS program students only. F.S.

MLS 508. Medical Laboratory Education: Teaching Principles. 3 Credits.
Approaches to teaching in Medical Laboratory Science will be examined, with an emphasis on development of instructional and evaluative materials. Additional topics discussed will include learner diversity, classroom management techniques, and course assessment. Offered once per 3-year cycle (fall or spring semester). See program website for current course rotation. Prerequisite: MLS program students only. F.S.

MLS 509. Medical Laboratory Education: Assessment and Accreditation. 3 Credits.
This course will focus on assessment and accreditation specific to medical laboratory education programs. Topics will include examination of assessment at the classroom, program, and institutional levels, including how to create and implement an assessment plan. Medical laboratory education accreditation processes will also be examined, with an emphasis on the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS) standards. Offered once per 3-year cycle (fall or spring semester). See program website for current course rotation. F.S.

MLS 510. Medical Laboratory Leadership: Principles & Practice. 1 Credit.
This course will provide an overview of leadership principles and their relation to the medical laboratory profession. On demand.

MLS 511. Advanced Clinical Immunology. 3 Credits.
An in-depth investigation of immune system functions. Correlation of laboratory results with normal and disease states will be emphasized. Offered once per 3-year cycle (fall or spring semester). See program website for current course rotation. Prerequisites: Restricted to MS in MLS program students only. F.S.

MLS 515. Capstone in Medical Laboratory Science. 2 Credits.
This course is a summative experience that occurs at the end of the degree process. Graduate-level Medical Laboratory Science students reflect upon and consider applications of degree coursework. Additionally, the future of the medical laboratory science profession will be discussed and career opportunities will be explored. Prerequisites: Completion of at least 20 credits in the MLS Master of Science Program; MLS program students only. S.

MLS 516. Special Topics in Medical Laboratory Science. 1-4 Credits.
Topical courses in laboratory medicine organized on a semester by semester basis. Prerequisite: MLS program students only. Repeatable to 12 credits. F.S.

MLS 517. Advanced Laboratory Practice: Administrative Concepts. 3 Credits.
An examination of administrative concepts and skills utilized to ensure quality in the medical laboratory. The course will focus on advanced concepts related to medical laboratory accreditation, inspection, and federal regulations. An emphasis will be placed on the utilization of best practices to monitor and improve laboratory diagnostics. Offered once per 3-year cycle (fall or spring semester). See program website for current course rotation. F.S.

MLS 518. Advanced Molecular Diagnostics. 3 Credits.
An analysis of specific molecular biology application in the medical laboratory including correlation of cell biology, DNA chemistry, genetics, and laboratory techniques in relation to diagnostic investigations. Course offered in Fall or Spring Semester on a 3-year cycle. F.S.

MLS 522. Advanced Clinical Bacteriology. 3 Credits.
An advanced study of the laboratory diagnosis of bacterial diseases and an in depth exploration of antibacterial agents. Offered once per 3-year cycle (fall or spring semester). See program website for current course rotation. F.S.

MLS 523. Advanced Non-Bacterial Microbiology. 3 Credits.
An advanced study of the laboratory diagnosis of viral, fungal, and parasitic diseases and associated antimicrobial agents. F.S.

MLS 524. Current Trends and Issues in Medical Laboratory Science. 2 Credits.
This course is an introductory experience that occurs at the beginning of the degree process. Through group discussion and presentations, Medical Laboratory Science graduate students will explore current trends and issues related to all aspects of the profession. F.

MLS 525. Professional Communication in the Medical Laboratory. 3 Credits.
This course will focus on developing written and oral communication skills as a foundation for application within the medical laboratory profession. Students will learn how to identify, assess, and incorporate appropriate reference materials to prepare professional, scholarly papers and presentations. Prerequisite: Must be satisfactorily completed in the first or second semester of degree coursework. F.S.

MLS 526. Advanced Clinical Hemostasis. 3 Credits.
A comprehensive study of the human hemostatic system. Normal function, disease pathophysiology, and the evolution of hemostasis in healthcare will be discussed. The laboratory's role in the diagnosis and/or monitoring of bleeding and clotting disorders will be emphasized. Offered once per 3-year cycle (fall or spring semester). See program website for current course rotation. F.S.

MLS 527. Medical Laboratory Education: Assessment and Accreditation. 3 Credits.
This course will focus on assessment and accreditation specific to medical laboratory education programs. Topics will include examination of assessment at the classroom, program, and institutional levels, including how to create and implement an assessment plan. Medical laboratory education accreditation processes will also be examined, with an emphasis on the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS) standards. Offered once per 3-year cycle (fall or spring semester). See program website for current course rotation. F.S.

MLS 530. Medical Laboratory Leadership: Principles & Practice. 1 Credit.
This course will provide an overview of leadership principles and their relation to the medical laboratory profession. On demand.
MLS 531. Medical Laboratory Leadership: Practical Applications. 1 Credit.
This course will focus on application of leadership strategies within the medical laboratory profession. On demand.

MLS 532. Medical Laboratory Leadership: Conflict Resolution. 1 Credit.
This course will focus on developing strategies and skills for conflict resolution within the medical laboratory profession. On demand.

MLS 589. Readings in Medical Laboratory Science. 1 Credit.
Examination of applicable literature related to Medical Laboratory Science as part of an area of specialization or interest. Prerequisite or Corequisite: MLS 525. Repeatable to 3 credits. F.S.

MLS 590. Project Development. 1 Credit.
With faculty/advisor consult, the student will identify a topic and develop a proposal for the Independent Study completed in MLS 997. Initial scholarly investigation of the selected topic will occur, and general guidelines for project format and content will be discussed. Prerequisite: MLS 525. F.S.

MLS 591. Directed Study in Laboratory Medicine. 1-6 Credits.
Designed to meet the needs of individual student-focused studies in laboratory medicine. Prerequisite: Restricted to Master of Medical Lab Science students. Repeatable to 6 credits. On demand.

MLS 996. Continuing Enrollment. 1-12 Credits.
Prerequisite: MLS program students only. Repeatable. S/U grading.

MLS 997. Independent Study. 2 Credits.
The independent study is a culminating experience for Medical Laboratory Science graduate students. Utilizing skills and information acquired throughout the degree process, students will select, investigate, and present findings of a topic with significance to the major field of study. Prerequisite: MLS program students only. F.S.

### Master of Science in Medical Laboratory Science

#### Admission Requirements

Applicants who are seeking admission to School of Graduate Studies must meet all of the minimum general School of Graduate Studies admission requirements identified in the graduate catalog. In addition, prospective students must fulfill the following requirements for admission to the graduate program in Medical Laboratory Science. Application deadlines can be found on the MLS or UND School of Graduate Studies websites.

1. B.A. or B.S. degree and successful completion of the MLS (NCA), MT (ASCP) certification examinations (include proof of certification with School of Graduate Studies application).
2. Cumulative Grade Point Average (GPA) of at least 3.0 (on a 4.0 scale) for the junior and senior years of undergraduate work.
3. Satisfy the School of Graduate Studies' English Language Proficiency requirements as published in the graduate catalog.
4. At least two years of prior work experience in a medical laboratory is preferred (include a resume of applicable work experience with School of Graduate Studies application).

#### Degree Requirements

Students seeking the Master of Science degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Medical Lab Science Program.

1. A minimum of 33 semester credits as follows (see 'Curriculum' for course lists):
   - Foundation Courses = 12 Credits
   - Core Courses = 12 Credits
   - Elective Courses = 9 Credits
2. A cognate area of study or minor (minimum of 9 credits) is optional.
3. Successful completion of comprehensive examinations that takes place at the end of the student’s program of study.

### Curriculum

#### FOUNDATION COURSES

All Foundation Courses are required for degree completion. Each course is offered at least annually. MLS 524 must be completed during the first or second fall semester of coursework. MLS 515 must be completed during the spring semester closest to degree completion. MLS 525 must be completed in the first semester of coursework.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>MLS 501</td>
<td>Advanced Laboratory Practice: Technical Concepts</td>
<td>3</td>
</tr>
<tr>
<td>MLS 515</td>
<td>Capstone in Medical Laboratory Science</td>
<td>2</td>
</tr>
<tr>
<td>MLS 524</td>
<td>Current Trends and Issues in Medical Laboratory Science</td>
<td>2</td>
</tr>
<tr>
<td>MLS 997</td>
<td>Independent Study</td>
<td>2</td>
</tr>
<tr>
<td>MLS 525</td>
<td>Professional Communication in the Medical Laboratory</td>
<td>3</td>
</tr>
</tbody>
</table>

#### CORE COURSES

At least 12 credits of Core Courses (from a minimum of 4 separate courses) of the listed Core Courses are required for degree completion. Core Course credits beyond 12 can be counted as Elective credits. Core Courses are offered on a 3-year cycle.

<table>
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<tr>
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</tr>
<tr>
<td>MLS 503</td>
<td>Advanced Clinical Hematology: Leukocytes</td>
<td>3</td>
</tr>
<tr>
<td>MLS 506</td>
<td>Advanced Clinical Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>MLS 507</td>
<td>Advanced Clinical Immunohematology</td>
<td>3</td>
</tr>
<tr>
<td>MLS 513</td>
<td>Advanced Clinical Immunology</td>
<td>3</td>
</tr>
<tr>
<td>MLS 518</td>
<td>Advanced Molecular Diagnostics</td>
<td>3</td>
</tr>
<tr>
<td>MLS 522</td>
<td>Advanced Clinical Bacteriology</td>
<td>3</td>
</tr>
</tbody>
</table>

*Only one of these courses can be counted as a Core Course (if both are taken, the second would be counted as an Elective)*

#### ELECTIVE COURSES

At least 9 credits (from a minimum of 3 separate courses) of Elective courses are required for degree completion. Note that any Core Course taken beyond the required 12 credits can also be counted as an Elective course. Elective courses are offered on a 3-year cycle, with the exception of MLS 516, MLS 589, MLS 590, and MLS 591 which are offered more frequently.

<table>
<thead>
<tr>
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</tr>
<tr>
<td>MLS 509</td>
<td>Medical Laboratory Education: Teaching Principles</td>
<td>3</td>
</tr>
<tr>
<td>MLS 516</td>
<td>Special Topics in Medical Laboratory Science</td>
<td>1-4</td>
</tr>
<tr>
<td>MLS 517</td>
<td>Advanced Laboratory Practice: Administrative Concepts</td>
<td>3</td>
</tr>
<tr>
<td>MLS 523</td>
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<td>MLS 527</td>
<td>Medical Laboratory Education: Assessment and Accreditation</td>
<td>3</td>
</tr>
<tr>
<td>MLS 530</td>
<td>Medical Laboratory Leadership: Principles &amp; Practice</td>
<td>1</td>
</tr>
<tr>
<td>MLS 531</td>
<td>Medical Laboratory Leadership: Practical Applications</td>
<td>1</td>
</tr>
<tr>
<td>MLS 532</td>
<td>Medical Laboratory Leadership: Conflict Resolution</td>
<td>1</td>
</tr>
<tr>
<td>MLS 589</td>
<td>Readings in Medical Laboratory Science</td>
<td>1</td>
</tr>
<tr>
<td>MLS 590</td>
<td>Project Development</td>
<td>1</td>
</tr>
<tr>
<td>MLS 591</td>
<td>Directed Study in Laboratory Medicine</td>
<td>1-6</td>
</tr>
</tbody>
</table>

### Music

#### Master of Music (p. 478)

#### Ph.D. in Music Education (p. 477)

#### Courses

MUSC 500. Introduction to Graduate Study in Music. 3 Credits.
A course covering bibliography, methodology and scholarly discourse in the principal areas of research in music. F.
MUSC 501. Graduate Music Theory Review. 1-3 Credits.
A comprehensive review of the harmonic, contrapuntal and formal elements of tonal and post-tonal music, designed to prepare students for graduate-level music courses. Credit earned does not count toward any degree. May be waived by examination. Repeatable to 3 credits. F.

MUSC 502. Perspectives in Music Theory. 3 Credits.
The study of formal systems in music through selected musical works. Prerequisites: MUSC 501 or passing grade on placement examination. S, even years.

MUSC 503. Psychological Foundations of Music Learning. 3 Credits.
An in-depth study of the psychological processes of music learning. S, odd years.

MUSC 504. Seminar in Music. 1-4 Credits.
Seminar concerning various topics of interest to the faculty and students.

MUSC 505. Graduate Music History Review. 3 Credits.
An accelerated comprehensive review of western music history designed to prepare students for other graduate-level music courses, emphasizing group learning through individual preparation. Credit does not count toward fulfillment of 32-hour minimum. Music graduate degree requirements. May be waived by examination.

MUSC 506. Advanced Composition. 1-4 Credits.
The composition and performance of original works in selected instrumental and vocal media. May be repeated without limitation. Repeatable.

MUSC 507. Foundations of Music Education. 3 Credits.
A comprehensive investigation of the historical, philosophical, and aesthetic foundations of music including current trends in music education. S, odd years.

MUSC 508. Perspectives of Music History. 3 Credits.
A course on various topics on the history and literature of music and related musicological fields. This course may require preparation and delivery of a substantial research paper on an appropriate topic. Repeatable when topics vary. Prerequisites: MUSC 500 and MUSC 505, or passing grade on placement examination, or instructor’s permission. Repeatable to 15 credits. S.

MUSC 509. Trends in Music Education. 3 Credits.
An overview of historical and contemporary trends in music education. S, even years.

MUSC 511. Chamber Music Literature. 3 Credits.
An historical overview of piano chamber music literature incorporating reading, listening, score study and analysis.

MUSC 512. Diction for Singers. 1 Credit.
Rules for and practical application of two of the major languages used in art song literature: Italian/English or French/German. May be repeated for credit up to 2 hours. F, odd years.

MUSC 521. Instrumental Literature. 3 Credits.
The study of instrumental music literature through scores and recordings. F, even years.

MUSC 522. Graduate Applied Music Literature. 2-3 Credits.
The advanced study, analysis, and history of solo and/or chamber music literature relevant to the student’s major instrument. Various topics. Repeatable to 6 credits. F, odd years.

MUSC 523. Keyboard Literature. 2-3 Credits.
This course is designed to introduce pianists to the keyboard literature from pre-Baroque to present day. S, even years.

MUSC 524. Choral Literature. 3 Credits.
The study of choral literature through scores and recordings. F, odd years.

MUSC 525. Vocal Literature. 3 Credits.
An historical overview of the development of art song and opera including reading, listening, score study and analysis. F, odd years.

MUSC 537. Advanced Studies in Musical Form. 2 Credits.
Advanced study and analysis of the principal forms of musical composition. Prerequisite: Graduate status. F, even years.

MUSC 538. Advanced Orchestration. 2 Credits.
Advanced study of orchestration and arranging techniques for various ensembles and combinations of instruments. Includes the study of exotic instruments. Prerequisite: Graduate status.

MUSC 539. Advanced Counterpoint. 2 Credits.
Advanced study of Counterpoint. Topics may include 16th-century styles, 18th-century styles, and/or 20th-century styles. The course includes both analysis of existing works, and composition of original works. Prerequisite: Graduate status.

MUSC 551. Vocal Pedagogy I. 3 Credits.
Teaching procedures, methods, and literature for teaching voice students from junior through upper intermediate levels, addressing questions of style, performance practices, editions, and techniques. Includes observation and teaching in both group and individual settings. F, even years.

MUSC 552. Keyboard Pedagogy I. 2-3 Credits.
This course is designed to introduce pianists to the art of teaching through discussions, lectures, and assignments which explore teaching techniques, materials, and methods appropriate for the beginning and elementary piano student. S, odd years.

MUSC 553. Vocal Pedagogy II. 3 Credits.
Teaching procedures, methods, and literature for teaching voice students from the late intermediate through advanced levels, addressing questions of style, performance practices, editions, and techniques. Includes observation and teaching in both group and individual settings. Prerequisite: MUSC 551.

MUSC 555. Graduate Applied Music Pedagogy. 2-3 Credits.
Advanced readings, instruction, and application of pedagogical principles and materials relevant to the student's major instrument. Repeatable to 6 credits. F, even years.

MUSC 559. Advanced Studies in Musical Form. 2 Credits.
Advanced study and analysis of the principal forms of musical composition. Prerequisite: Graduate status. F, even years.

MUSC 561. Advanced Choral Conducting. 2 Credits.
Choral schools and composers since the sixteenth century, study of interpretations based on scores, recordings, and class performance. S, odd years.

MUSC 562. Advanced Instrumental Conducting. 2 Credits.
Advanced techniques of instrumental conducting and score reading. S, even years.

MUSC 570. Instrumental Ensemble Performance. 1 Credit.
Repeatable to 2 credits for Music Education students. For others, repeatable without limitation. Repeatable to 20 credits. F.S.

MUSC 578. Seminar for Collaborative Piano. 1 Credit.
Seminar for the application of collaborative piano techniques. May be repeated for credit up to 2 hours. F.S.

MUSC 579. Chamber Ensembles. 1 Credit.
Exploration of chamber music works and cultivation of its advanced techniques. The student's progress is evaluated through final jury performance or public performance. Repeatable without limitation. Repeatable. F.S.

MUSC 580. Choral Ensemble Performance. 1 Credit.
Repeatable to 2 credits for Music Education students. For others, repeatable without limitation. Repeatable to 20 credits. F.S.

MUSC 581. Graduate Opera Workshop. 1 Credit.
Graduate level staged performance of operatic literature: chamber operas, scenes from larger works, and major productions. Prerequisite: Permission of the instructor. Corequisite: Enrollment in graduate level voice lessons. Repeatable. S.

MUSC 590. Internship in Music. 1-9 Credits.
This course is intended for students seeking internships in the field of music. All placements will be conducted under the supervision of an appropriate music professional. Arranged by mutual agreement between student, department and placement supervisor. Repeatable to 18 credits. On demand.

MUSC 592. Individual Lessons: Collaborative Piano. 2 Credits.
Individual lessons for the collaborative piano major to broaden knowledge of collaborative repertoire, develop sight-reading proficiency, and strengthen accompanying skills. Public performance is a prominent grading component. Repeatable. F.S.

MUSC 593. Final Project in Composition. 4 Credits.
The composition and performance of an original musical work of proportions suitable for a final composition project at the master's level.
MUSC 594. Individual Lessons. 1 Credit.
Individual lessons in secondary instruments, conducting or voice. In registering for private lessons in voice, piano, organ, conducting or any orchestral instrument, “Voice” or the name of the instrument serves as the title of the course. For the final examination (excluding conducting), the student will perform before a faculty committee. May be repeated for credit without limitation. Repeatable.

MUSC 595. Individual Lessons. 1-2 Credits.
Individual lessons in the major instrument for non-performance music degree programs. In registering for private lessons, “Voice” or the name of the instrument serves as the title of the course. For the final examination (excluding conducting), the student will perform before a faculty committee. May be repeated for credit without limitation. Prerequisite: Permission of the Instructor. Repeatable. F,S.

MUSC 596. Individual Lessons. 1-4 Credits.
Individual lessons in the major instrument for the performance major. In registering for private lessons, “Voice” or the name of the instrument serves as the title of the course. For the final examination, the student will perform before a faculty committee. May be repeated for credit without limitation. Prerequisite: Permission of Instructor. Repeatable. F,S.

MUSC 597. Special Projects. 1-3 Credits.
Individual study in an approved area of interest to the student. Repeatable to 30 credits.

MUSC 598. Research in Music Education. 3 Credits.
An introduction to qualitative and quantitative research methodology relative to music education. F, even years.

MUSC 599. Graduate Recital. 2 Credits.
The presentation of a graduate recital. Recitals may not be given until a recital audition has been reviewed and approved by the applied instructor and the student's master's committee. Music Education students must also complete an associated document. Repeatable to 4 credits. Prerequisite: Consent of instructor. Corequisites: MUSC 595 or MUSC 596. Repeatable to 4 credits. F,S.

MUSC 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

MUSC 997. Independent Study. 2 Credits.
Independent study and preparation of a written document. Prerequisite: Permission of advisor.

MUSC 998. Thesis. 4 Credits.
Prerequisite: Permission of advisor.

MUSC 999. Dissertation. 1-15 Credits.
Prerequisite: Permission of advisor. Repeatable to 15 credits.

**Doctor of Philosophy in Music Education**

**Admission Requirements**
Admission requirements for the Doctor of Philosophy degree in Music Education are the same as those found under the Teaching and Learning Doctoral Program in Education and are listed below.

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. Graduate grade point average(s) above 3.5.
2. Excellent writing skills.
3. Three references that speak to academic ability, professional accomplishments related to your field of study, and positive character traits.
4. A statement of clear professional goals that can be met by our program as specified in the graduate catalog.
5. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

Recommended: The Graduate Record General Examination (verbal, quantitative, analytical), the Advanced Graduate Record Examination, and/or the Miller Analogies Test.

**Degree Requirements**
Students seeking the Doctor of Philosophy degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Music Department.

**Requirements for the Doctor of Philosophy Degree set forth by the Music Department include:**
The Ph.D. program of study in Teaching and Learning shall include the following:

1. Completion of 90-96 semester credits beyond the baccalaureate degree.
2. Maintenance of at least a 3.0 GPA for all classes completed as a graduate student.
3. With approval of a student’s Faculty Advisory Committee, up to one-half of the work beyond a master’s degree (maximum of 30 semester credit hours) may be transferred from another institution that offers post-master’s degrees in the discipline.
4. At least one-half of the work must be in the major field, including:
   a. at least 10 credits of dissertation, which incorporates independent work that is an original contribution to knowledge in the field.
   b. A minimum of 6 credits in the Foundations of Education.
   c. A minimum of 12 credits of scholarly tools
5. At least 12 hours of a minor or cognate in a supporting area.
6. Meet one of the three residency options described below:

**Residency Requirements**
The purpose of residency is to provide an opportunity for sustained and concentrated intellectual effort, to provide for immersion in a research environment, and to permit extensive interaction with fellow students and faculty of the major department.

The residency for the Ph.D. in Music Education is designed to provide the student with the experiences outlined by the School of Graduate Studies. Students are expected to engage in serious scholarship and reflect on their learning and experiences, as well as to integrate their doctoral study such that the program of study they pursue will become a unified experience. A doctoral student in Music Education can meet the residency requirement in any one of the following ways:

1. Students will complete a residency while enrolled in a minimum of nine semester hours of credit during each of two consecutive semesters (Fall/Spring or Spring/Fall). Students in this option are encouraged, but are not required, to enroll in a Doctoral Seminar during their residency or at another time in the program. If a student is a GTA, GSA or GRA, the number of credits that the student may take for this option is less and is specified in the catalog.
2. Students will complete a residency while enrolled in a minimum of eight semester hours of credit during each of three consecutive summer sessions and in a minimum of two Doctoral Seminars following their first and second or third summers in residence.
3. Students will complete a residency over a period of three consecutive years of continuous enrollment in a minimum of 36 hours of credit (12 credits per year for three years), to include a minimum of two Doctoral Seminars during the period of residency.

Core Courses listed above

**Music Education Component**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MUSC 503</td>
<td>Psychological Foundations of Music Learning</td>
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<tr>
<td>MUSC 507</td>
<td>Foundations of Music Education</td>
<td>3</td>
</tr>
<tr>
<td>MUSC 999</td>
<td>Dissertation</td>
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<tr>
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<td>Music Electives (other studies in Music)</td>
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**Teaching & Learning Core (minimum of 12 credits)**

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<th>Course Title</th>
<th>Credits</th>
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<tr>
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<td>College Teaching</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 545</td>
<td>Adult Learners</td>
<td>3</td>
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<td></td>
<td>Teaching &amp; Learning Core Electives (selected from T&amp;L list in consultation with adviser)</td>
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**Foundations of Education**

<table>
<thead>
<tr>
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<th>Course Title</th>
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<tbody>
<tr>
<td>EFR 500</td>
<td>Introduction to the Foundations of Education</td>
<td>3</td>
</tr>
</tbody>
</table>
Master of Music in Collaborative Piano

Specific Degrees

Additional Admission Requirements for Specific Degrees

(to be sent directly to the Music Department)

Master of Music in All Areas of Performance, Pedagogy or Conducting

1. Audition on the major performing instrument or voice on campus, via virtual live audition, or by live recording of a recent performance.
   a. Coordinate directly with the applied instructor or area conductor (choral or instrumental).
   b. Repertoire list of works studied and/or conducted or studied and/or performed on the major performing instrument or voice.
   c. Additional, for Vocal Pedagogy and Vocal Performance: Performance resume; evidence of two years’ satisfactory study of French, German, or Italian; and knowledge of the lyric diction of all three.

Master of Music in Collaborative Piano

1. Audition on campus, via virtual live audition, or by live recording of a recent performance.
   a. Coordinate directly with the applied piano instructor. If auditioning on campus, you must supply your own partners.
   b. Resume detailing education and collaborative piano experience.

Supporting Area and Electives

Minimal Admission Requirements for the general admission requirements as published in the graduate catalog.

The applicant must meet the School of Graduate Studies' current minimum Admission Requirements Master of Music degree set forth by Coordinate directly with the applied instructor or area conductor (choral or instrumental).

MUSC 503 Psychological Foundations of Music Learning (listed above) 3
MUSC 507 Foundations of Music Education (listed above) 3
Scholarly Tools in Education

(may serve as Research cognate, 3 options, see below) 12

Supporting Area and Electives

(may include Minor, 24 credits or Cognate, 12 credits) 21-26

Scholarly Tools Options (courses below or equivalents)

Option 1: Qualitative Emphasis Option

EFR 510 Qualitative Research Methods 3
EFR 520 Advanced Qualitative Research Methods 3
EFR 516 Statistics II 3
MUSC 598 Research in Music Education 3
Or equivalents

Option 2: Quantitative Emphasis Option

EFR 510 Qualitative Research Methods 3
EFR 516 Statistics II 3
EFR 518 Multivariate Analysis 3
MUSC 598 Research in Music Education 3
Or equivalents

Option 3: Tests and Measurements Option

EFR 511 Program Evaluation 3
EFR 512 Survey and Test Design 3
EFR 516 Statistics II 3
MUSC 598 Research in Music Education 3

Master of Music in Composition

1. A representative sample of compositions.

All students admitted to graduate study in music, whether to Approved, Qualified, or Provisional status, will be examined upon their arrival on campus in order to provide appropriate advisement for the beginning of graduate study. These examinations will cover Music History, Music Theory, and, for Vocal Performance majors, French, German, and Italian lyric diction.

Achievement of a minimum score on the entrance examinations or completion of MUSC 501 Graduate Music Theory Review and MUSC 505 Graduate Music History Review is required prior to registration in MUSC 502 Perspectives in Music Theory and MUSC 508 Perspectives of Music History.

Degree Requirements - M.M. and Ph.D.

All Graduate Music degree programs (M.M. & Ph.D.) require the following Core Courses:

MUSC 500 Introduction to Graduate Study in Music 3
MUSC 502 Perspectives in Music Theory 3
MUSC 508 Perspectives of Music History 3

Total Credits 9

Degree Requirements - M.M.

Students seeking the Master’s degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Music Department.

Degree requirements for the Master of Music degree in Music Department include:

1. 32-38 credit hours in one of the available seven specializations:
   a. Music Education
   b. Performance
   c. Vocal Pedagogy
   d. Composition
   e. Choral Conducting
   f. Instrumental Conducting
   g. Collaborative Piano

2. At least one-half of the credits must be at or above the 500-level.

3. The specialization in Conducting requires at least a one-year residence.

Music Education Specialization

Independent Study Option

Core Courses listed above 9
MUSC 503 Psychological Foundations of Music Learning 3
MUSC 509 Trends in Music Education 3
MUSC 598 Research in Music Education 3
MUSC 997 Independent Study (Music Education topic) 2
Electives in Music Education 6
Electives (from outside Music Education, may be from outside the Department of Music) 6-12

Total Credits 32-38

Thesis Option

Core Courses listed above 9
MUSC 503 Psychological Foundations of Music Learning 3
MUSC 509 Trends in Music Education 3
MUSC 598 Research in Music Education 3
MUSC 998 Thesis (Music Education Topic) 4
### Performance Option

Core Courses listed above

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<td>T&amp;L 433</td>
<td>T&amp;L 386</td>
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<tr>
<td>T&amp;L 452</td>
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<tr>
<td>T&amp;L 468</td>
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Electives in Music Education, may be from outside the Department of Music

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<td>T&amp;L 486</td>
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Performance Courses

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<tr>
<td>MUSC 592</td>
<td>Individual Lessons</td>
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<tr>
<td>MUSC 598</td>
<td>Graduate Recital</td>
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Other Studies

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<tr>
<td>Electives</td>
<td>Electives</td>
<td>3-9</td>
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Teacher Education Option

Prerequisite Degree: B.A., B.S., or B.M. in Music or Music Therapy

Core Courses listed above

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<th>Course Code</th>
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<tbody>
<tr>
<td>T&amp;L 487</td>
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<td>T&amp;L 433</td>
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<td>T&amp;L 452</td>
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<td>T&amp;L 468</td>
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Electives in Music Education, may be from outside the Department of Music

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<tbody>
<tr>
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Conducting Courses (required for conducting students only)

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<tbody>
<tr>
<td>MUSC 521</td>
<td>Instrumental Literature</td>
<td>3</td>
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<tr>
<td>or MUSC 524</td>
<td>Choral Literature</td>
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<tr>
<td>MUSC 561</td>
<td>Advanced Choral Conducting</td>
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<tr>
<td>or MUSC 562</td>
<td>Advanced Instrumental Conducting</td>
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Methods Courses

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<tbody>
<tr>
<td>MUSC 440</td>
<td>Methods and Materials for Elementary Music</td>
<td>3</td>
</tr>
<tr>
<td>MUSC 441</td>
<td>Methods and Materials for Middle and Secondary School Music</td>
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Recital

<table>
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<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>MUSC 599</td>
<td>Graduate Recital</td>
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Total Credits 32-38

### Performance Specialization

Core Courses listed above

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<th>Course Title</th>
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<tbody>
<tr>
<td>MUSC 522</td>
<td>Graduate Applied Music Literature</td>
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<tr>
<td>MUSC 552</td>
<td>Graduate Applied Music Pedagogy</td>
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<tr>
<td>MUSC 570</td>
<td>Instrumental Ensemble Performance (Instrumental Major)</td>
<td>2</td>
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<tr>
<td>MUSC 579</td>
<td>Chamber Ensembles (Instrumental Major)</td>
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Other Studies

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<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
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Vocal Pedagogy Specialization

Core Courses listed above

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<tr>
<td>MUSC 525</td>
<td>Vocal Literature</td>
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<tr>
<td>MUSC 551</td>
<td>Vocal Pedagogy I</td>
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<tr>
<td>MUSC 590</td>
<td>Internship in Music</td>
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Other Studies

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<tbody>
<tr>
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</table>

Total Credits 33-38

### Music Composition Specialization

Core Courses listed above

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<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tr>
<td>MUSC 506</td>
<td>Advanced Composition</td>
<td>8</td>
</tr>
<tr>
<td>MUSC 537</td>
<td>Advanced Studies in Musical Form</td>
<td>2</td>
</tr>
<tr>
<td>MUSC 538</td>
<td>Advanced Orchestration</td>
<td>2</td>
</tr>
<tr>
<td>MUSC 539</td>
<td>Advanced Counterpoint</td>
<td>2</td>
</tr>
<tr>
<td>MUSC 593</td>
<td>Final Project in Composition</td>
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Electives

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<tbody>
<tr>
<td>Electives</td>
<td>Electives</td>
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</table>

Total Credits 32-38

For those in the composition concentration, the final project in composition replaces an independent study.

All students must demonstrate keyboard proficiency equivalent to level 4; keyboard principals must demonstrate an equivalent level of vocal proficiency.

Some 300 and 400 level courses may be permitted to fulfill graduate elective requirements, subject to School of Graduate Studies academic policies.
NURS 500. Evidence for Practice. 3 Credits.
This course emphasizes the application of basic research concepts to the building of evidence-based practice in nursing. Advanced competencies are developed in searching and evaluating the literature, examining the merit of different types and levels of evidence, and analyzing the generalizability and implications for clinical practice. Prerequisites or Corequisites: Admission to one of the Graduate Nursing Tracks, NURS 500 and statistics and/or permission of instructor. F.S.

NURS 503. The Business of Practice. 2 Credits.
This course focuses on the business aspects of Inter-professional advanced practice in the complex health care environment. Prerequisite: Admission to the DNP Program.

NURS 504. Advanced Pharmacology I. 3 Credits.
Pharmacodynamic and pharmacokinetic principles with a focus on clinical anesthesia practice. Physiologic systems and drug classifications are used; emphasis on therapeutic use, side effects, drug interactions, and contraindications of drugs used for intravenous anesthesia induction, inhalation, and balanced anesthesia maintenance. Pediatric and geriatric variations will be addressed. Prerequisite: Admission to Nurse Anesthesia Specialization.

NURS 505. Advanced Pharmacology. 3 Credits.
The focus of this course is on the basic and advanced clinical concepts of pharmacology for the advanced practice nurse. Medication selection and administration will be addressed. Anatomy, physiology, and pathophysiology will be reviewed as appropriate to the physiologic system or medication class being discussed. Evidence-based guidelines with respect to the clinical application of medications utilized in selected acute and chronic health problems will be explored. Prerequisite or Corequisite: Admission to Graduate Nursing Program. F.

NURS 506. Advanced Pharmacology II. 3 Credits.
Advanced pharmacology for clinical nurse anesthesia practice. Prerequisite: NURS 504.

NURS 507. Anesthesia Seminar and Clinical Practicum. 4 Credits.
This course is designed to provide nurse anesthesia students an overview of the basic principles and skills needed to care for the routine surgical patient. Topics include difficult airway management, patient monitoring, patient preparation, positioning, patient safety, fluid and electrolyte management, documentation of anesthesia care, and an introduction to regional anesthesia. Analysis, integration, and utilization of research to improve practice is emphasized. The lecture content is reinforced through Clinical Simulation and laboratory experiences, allowing for immediate application of the lecture content and integration into the clinical setting. Students are introduced to the clinical setting through observational and hands-on experiences. Includes a clinical and/or laboratory component. Prerequisite: NURS 521.

NURS 508. Nurse Anesthesia Review Course. 1 Credit.
This course is faculty guided and designed to assist students with their review of nurse anesthesia course and clinical material in preparation for the CCNA certification examination. Prerequisite: Completion of all Nurse Anesthesia Specialization coursework.

NURS 509. Foundations for Nurse Education. 3 Credits.
This course begins to compare and contrast multiple roles and responsibilities of nurse educators in various settings in academic and health service. It will build the conceptual foundation for educational processes with emphasis on ethics, learning theories, taxonomies of learning and current evidence necessary for development of competencies necessary for the practice of educating. Students will begin to formulate their individual philosophy of teaching and learning. Prerequisite: Admission to the Nursing Graduate Program or consent of the instructor. Prerequisite or Corequisite: NURS 500. S.

NURS 510. Adv Physiology/Pathophysiology I. 3 Credits.
Normal physiologic functions associated with cellular structure and environment. Physiologic and pathophysiologic functions of the human body and its organ systems, both separately and integrated in whole activities. Prerequisite: Admissions to graduate study.

NURS 511. Adv Physiology/Pathophys II. 3 Credits.
Physiologic and pathophysiologic functions of the human body and its organ systems, both separately and integrated in whole activities. Prerequisite: NURS 510 or consent of instructor.

NURS 512. DNP Core Concepts I. 2 Credits.
This course is an exploration of the core concepts that support the developing role of the DNP as a practice focused leader and researcher. Prerequisite: Admission to the DNP Program.
NURS 513. DNP Core Concepts II. 2 Credits.
This course focuses on the concepts that support the development of the role of the DNP practice leader in the care of rural and vulnerable populations and issues related to planning and providing care for vulnerable and underserved populations. The primary content focus areas are epidemiology and vulnerability related to population and individual health. Prerequisites: Admission to the DNP Program and NURS 512. S.

NURS 514. Essentials in Epidemiology. 3 Credits.
This course will emphasize the application of the principles of epidemiology as applied to the investigation and prevention of individual and population health problems. Students will evaluate care delivery models and analyze epidemiological data to develop and apply strategies for health promotion and disease prevention for individuals, aggregates, and populations. The core competencies will focus not only on the practice of public health, but also enhance practice for the clinician. Prerequisite: Admission to the Graduate School, MPH Program, or permission of the the instructor. F,S.

NURS 515. Basic Principles of Anesthesia Practice I. 3 Credits.
This course provides an introduction to the fundamental principles necessary for the safe, professional, and individualized anesthetic care of diverse patients. Foundational concepts such as chemistry and physics as they apply to anesthesia practice, pharmacology of anesthetic agents, uncomplicated airway management, anesthesia delivery systems, and physiological monitoring will be investigated. Low and high fidelity patient simulation will be utilized to develop the student's cognitive and psychomotor skills which are essential to clinical anesthesia management. The course will conclude with a clinical component designed to acclimate beginning nurse anesthesia students to the clinical anesthesia arena. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. F.

NURS 516. Basic Principles of Anesthesia Practice II. 3 Credits.
This course builds upon the fundamentals covered in Basic Principles of Anesthesia I, all of which are necessary for the safe, professional, and individualized anesthetic care of diverse patients. Concepts such as basic perioperative anesthetic management, pain management, regional anesthesia, difficult airway management, effective oral and written communication, and patient and healthcare provider safety are emphasized. Low and high fidelity patient simulation will be utilized to develop the student's cognitive and psychomotor skills which are essential to clinical anesthesia management. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S.

NURS 517. Anesthesia Seminar and Clinical Practicum II. 5 Credits.
This course builds on the foundations learned in the prerequisite course. Advanced anesthesia principles are applied to various patient populations including the surgical patient with cardiovascular and respiratory diseases. Anesthesia care of other surgical populations including the trauma, orthopedic, urological, vascular, intra-abdominal and ENT patient will be explored. Important concepts include anatomical, physiological and pathophysiological, and pharmacological principles. Analysis, integration, and utilization of research to improve practice is emphasized. The lecture content is reinforced through simulated laboratory experiences, allowing for immediate application of the lecture content and integration into the clinical setting. A clinical rotation is included. Prerequisite: NURS 507.

NURS 518. Pharmacotherapeutics for Nurse Anesthesia. 2 Credits.
The focus of this course is on advanced clinical concepts of pharmacology relevant to the nurse anesthetist during the perioperative period. This course utilizes concepts from NURS 505 Advanced Pharmacology and further advances the student's knowledge in pharmacological concepts related to the practice of anesthesia. This course will examine the clinical application of anesthesia specific pharmacologic principles into formulating anesthetic plans for diverse patient populations. Prerequisite or Corequisite: NURS 505; Admission to the DNP Program - Nurse Anesthesia Track. S.

NURS 519. Practice Leadership. 2 Credits.
This course focuses on practice leadership theories and strategies related to the role of the DNP advanced practice nurse within the complex health care system. Prerequisite: Admission to DNP Program or consent of instructor.

NURS 520. Prof Role Dvlpmnt/Nurse Anesthesia. 3 Credits.
The focus of this course is on the identification and analysis of the professional components of nurse anesthesia practice, emphasizing role development; management and leadership; medical, ethical and legal responsibilities; the provision of culturally competent care; and scope of professional practice. Other areas that will be explored include quality improvement, the legislative process, credentialing, professional organizations, conflict resolution, and self-care and stress management for the anesthetist. An in-depth analysis of current trends and issues affecting healthcare and the delivery of anesthesia services are included in the course content. Prerequisites: NURS 521 and NURS 507. Corequisite: NURS 517.

NURS 521. Foundations of Anesthesia Practice. 3 Credits.
This course provides the foundation for nurse anesthesia practice. Lecture and discussion begin with an analysis of the history of anesthesia nursing, professionalism, and standards of care for the anesthetist. Safety in the nurse anesthesia environment will be emphasized. Additional content includes the applied chemical, physical, and biochemical concepts as they relate to anesthesia practice, including the mechanisms of anesthesia, medical mathematics, medical gas systems, laws governing gases, the anesthesia machine, monitoring principles and equipment, airway equipment and basic airway management, and universal precautions. Prerequisite: Admission to the Nurse Anesthesia Specialization.

NURS 522. Advanced Pathophysiology. 3 Credits.
This course presents a system-focused approach to alterations in normal physiological mechanisms that result in pathologic disease processes. Physiological changes are compared and contrasted over the lifespan and developmental cellular physiology, pathogenesis and clinical manifestations commonly observed in altered health states are reviewed. This knowledge serves as the foundation for advanced clinical assessment, decision making and management for the advanced practice nurse. Prerequisite: Admission to graduate study. F,S,SS.

NURS 523. Health Promotion. 3 Credits.
Paradigms in health promotion, health detection, and disease prevention across the lifespan are used in synthesis in theory and evidence-based primary care interventions. Prerequisite: Admission to the Nursing Graduate Program or consent of the instructor. F,S.

NURS 524. Anatomy for Nurse Anesthetists. 1 Credit.
This course builds upon the concepts and fundamentals of Basic Principles of Anesthesia I and II as it relates to the detailed regional anatomy of the human body. A cadaver laboratory experience will be utilized throughout the course to develop the student's understanding of clinical anatomy related to the airway, central nervous system, peripheral nerves, cardiovascular system, and pulmonary system with an anesthesia context. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S.

NURS 525. Applied Multivariate Statistics. 3 Credits.
Principles, assumptions and applications of major multivariate statistical techniques commonly used in nursing and clinical health research. Prerequisite: Graduate level univariate statistics and admission to the Nursing Doctoral Program or consent of the instructor. F.

NURS 526. Ethical, Legal and Health Policy Issues. 3 Credits.
This course emphasizes health policy issues within the context of legal and ethical concepts. Students will examine and debate health policies in current practice, thus broadening their ability to analyze, implement, and evaluate health policy issues.

NURS 527. Anesthesia Seminar and Clinical Practicum III. 5 Credits.
This course further builds on the foundations laid in prerequisite courses. Students will incorporate previously learned anatomy, physiology, pathophysiology, and patient management into the care of subspecialty patients and patients with complex co-existing diseases. Advanced anesthesia principles are applied to the OB, pediatric, geriatric, and neuro patient. The pharmacology and anesthesia management of these subspecialty populations and patients with various disease states, such as kidney, musculoskeletal, and endocrine disorders, will be explored. Analysis, integration, and utilization of research to improve clinical practice is emphasized. The lecture content is reinforced with a clinical experience that emphasizes anesthesia care for subspecialty populations. A clinical/laboratory component is included. Prerequisite: NUR 517.
NURS 528. Advanced Principles of Anesthesia Practice I. 4 Credits.
This course builds upon the nurse anesthesia foundations covered previously in the Basic Principles of Anesthesia I and II courses. An evidence-based approach to the anesthetic evaluation, planning, and management of diverse and increasingly complex patient populations, such as those with pre-existing respiratory, cardiac, and renal diseases, will be the focus. The hands-on administration of safe, individualized, and comprehensive anesthetic plans of care to both simulated and actual patients will be introduced and emphasized. Low and high fidelity patient simulation will be utilized to continue developing the student’s cognitive and psychomotor skills which are essential to perform clinical anesthesia management. A clinical component will allow the student to apply theoretical principles to nurse anesthesia practice and to increase their clinical skills, knowledge, and autonomy. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. SS.

NURS 529. Advanced Principles of Anesthesia Practice II. 6 Credits.
This course builds on the foundations covered in Basic Principles of Anesthesia I and II along with Advanced Principles I including the evaluation, planning, and management of diverse and increasingly complex patient populations. Evidence-based advanced principles of anesthesia care will be investigated in order to construct and implement comprehensive and individualized anesthetic plans of care for the management of subspecialty patients. Obstetrical and pediatric populations, as well as patients with complex co-existing diseases and/or those undergoing complex surgical procedures will be the focus. Low and high fidelity patient simulation will be utilized to continue developing the student’s cognitive and psychomotor skills which are essential to perform clinical anesthesia management. A clinical component will allow the student to apply theoretical principles to nurse anesthesia practice and to increase their clinical skills, knowledge, and autonomy. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. F.

NURS 530. Research Design & Methods in Nursing. 3 Credits.
Prerequisite or corequisite: NURS 500 or consent of instructor.

NURS 531. Adult-Gerontology Illness Management I. 3 Credits.
This is the first of a two-course sequence that focuses on evidenced-based primary care diagnosis and management of common episodic/chronic problems encountered by young adults, adults, older adults and their social network in ambulatory, inpatient, and community settings. Physiological, psychosocial, and pharmacological interventions are integrated into the holistic care that incorporates age-related, cultural, family, and community variations. An on-campus intensive is required for this course. Prerequisites: NURS 511 and NURS 585. Corequisite: NURS 597. F.

NURS 532. Family Centered Advanced Practice Nursing. 3 Credits.
Theoretical and scientific foundations for advanced practice nursing care for the family-as-a-unit in health and illness across the lifespan. Prerequisite: Admission to DNP program or consent of instructor. S.

NURS 533. Adult-Gerontology Illness Management II. 3 Credits.
This is the second of a two-course sequence that focuses on evidenced-based primary care diagnosis and management of common episodic/chronic problems encountered by young adults, adults, older adults and their social network in ambulatory, inpatient, and community settings. Physiological, psychosocial, and pharmacological interventions are integrated into the holistic care that incorporates age-related, cultural, family, and community variations. An on-campus intensive is required for this course. Prerequisite: NURS 531. Corequisite: NURS 597. S.

NURS 534. Management of Health Conditions in Primary Care I. 3 Credits.
This is the first of a two-course sequence that focuses on evidenced-based primary care diagnosis and management of common episodic/chronic problems encountered by adults, including young adults, middle aged adults and older adults and their social network in ambulatory, inpatient, and community settings. Physiological, psychosocial, and pharmacological interventions are integrated into the holistic care that incorporates age-related, cultural, family, and community variations. Prerequisites: NURS 522 and NURS 585. Corequisite: NURS 597 (II). F,S,SS.

NURS 535. Advanced Pharmacology for Primary Care I. 2 Credits.
Pharmacological agents utilized to treat common acute and chronic health problems are explored in depth. The course focus is on advanced nurse practice roles related to prescription, pharmacological, and therapeutic applications of the drugs. Prerequisite: Admission to the Nursing Graduate Program or consent of the instructor. Prerequisite or corequisite: NURS 510. F.S.

NURS 536. Advanced Nurse Educator Practice of Health Promotion. 2 Credits.
This practicum course affords the Nurse Educator student with opportunities to develop advanced skills in teaching-learning practices in the rural health care environments. The student will apply educational theories and best-evidence teaching strategies with a particular emphasis in education related to health promotion strategies. This course will include topics such as the Nurse Educator role to promote health in rural communities, assess health literacy, and develop appropriate patient educational materials. The practicum emphasizes health promotion education to meet diverse needs of rural dwelling patients, families and groups. Prerequisites: NURS 500, NURS 511, NURS 539, and NURS 514. Corequisite: NURS 526, and NURS 569. F.

NURS 537. Graduate Cooperative Education. 1-2 Credits.
The course focus is upon experience in advanced nursing practice integrating theory, research, and advanced practice in a specific area of nursing. Course overview: the purpose of this course is to provide the graduate student with advanced nursing practice as an employee in a health care agency and to evaluate that experience in relation to the educational program. A clinical/laboratory component is included. Prerequisite: Permission of Graduate Director of Nursing. Repeatable to 9 credits.

NURS 538. Psych Diagnostic Reasoning. 2 Credits.
This course prepares students for advanced therapeutic communication, interviewing, and assessment of people with mental illness across the life span. Skills are developed in differential diagnoses of psychopathology within the scope and standards of advanced psychiatric mental health nursing practice. Clinical application is included. Prerequisite: Acceptance into the PMHNP program or permission of instructor. S.

NURS 539. Advanced Pharmacology for Primary Care II. 2 Credits.
Pharmacological agents utilized to treat common acute and chronic health problems are explored in depth. The course focus is on advanced nurse practice roles related to prescription, pharmacological, and therapeutic applications of the drugs. Prerequisite: Admission to nursing graduate program and NURS 535 or consent of instructor. F.S.

NURS 540. Management of Health Conditions in Primary Care II. 3 Credits.
Clinical decision making skills are developed in the diagnosis and management of acute and chronic health conditions throughout the lifespan. Health promotion, health protection, and disease prevention are emphasized. Prerequisite: NURS 534. F,S,SS.

NURS 541. Illness Management - Adult Gerontology I. 3 Credits.
This is the first of a two-course sequence focusing on evidence-based primary care specific to the adult-gerontology population which includes adolescents, young adults and frail, older adults. This course prepares students to provide healthcare services across the adult-gerontology age spectrum from wellness to illness, using scientific knowledge and theoretical foundations to differentiate between normal and abnormal changes in physiological, psychological and sociological development and aging. Students will develop strategies to provide and coordinate interdisciplinary and holistic care that incorporates age-related, cultural, family, and community variations. Prerequisites: NURS 522, NURS 585, and NURS 597 (I). Corequisite: NURS 597 (II). F,S,SS.

NURS 542. Professional Aspects of Nurse Anesthesia Practice. 3 Credits.
This course provides the entry-level nurse anesthesia student with a foundational knowledge of professional aspects related to nurse anesthesia practice. The focus of this course is on historical perspectives, professional role development, anesthesia business practices, and professional wellness. Prerequisite: Admission to the DNP Program - Nurse Anesthesia Track. F.

NURS 543. Illness Management - Adult Gerontology II. 3 Credits.
This is the second of a two-course sequence that focuses on evidence based primary care specific to the adult-gerontology population which includes adolescents and young adults to frail, older adults. Course work focuses on evidence based acute and chronic care diagnosis and management of common episodic acute and chronic problems encountered by the adult-gerontological population. Physiological, psychosocial, and pharmacological assessments, including changes associated with aging and development across the adolescent - adult continuum are integrated into the formation of differential diagnosis and interventions of clinical problems in collaboration with other care providers. Prerequisites: NURS 541 and NURS 597 (II). Corequisite: NURS 597 (III). F,S,SS.
NURS 544. Pharmacotherapeutics for Primary Care. 2 Credits.
This course will help prepare the advance practice nursing student for prescriptive authority. Topics will focus on decision making regarding the pharmacological management of common acute and chronic illnesses encountered in primary care settings. Pharmacokinetics, pharmacodynamics, adverse drug reactions, and contraindications will be discussed. Ethical and legal principles of writing prescriptions will also be covered. Students will synthesize research findings related to various medications using case study and discussion. Prerequisites: Admission to DNP program (FNP, AGNP tracks), and NURS 505. S.

NURS 545. Care of the Frail Older Adult. 3 Credits.
In this course the advanced practice nursing student will focus on the complex and multifactorial health care needs of frail elders. Students will develop strategies to provide and coordinate interdisciplinary and holistic care of the frail elderly in a variety of settings. Prerequisite: Admission to DNP program or consent of instructor. S.

NURS 546. Advanced PHN I. 4 Credits.
NURS 546 introduces concepts foundational to advanced PHN practice and population health. Corequisite: NURS 547.

NURS 547. Advanced PHN Practicum I. 4 Credits.
The focus of this course is on application of foundational concepts of Advanced PHN practice. Students will conduct a community assessment and identify community problems and strengths. Written and oral communication skills are emphasized. Corequisite: NURS 546.

NURS 548. Advanced PHN II. 3 Credits.
This course focuses on the leadership role of advanced PHN practice. Public health and community-based organizational assessment, program monitoring and evaluation, quality improvement, and management of multiple projects are emphasized. Concepts of leadership in public and community health and collaborative interdisciplinary practice are discussed. Health policy and law and ethics as they relate to public health are explored. In addition, advanced PHN leadership in rural areas and in disaster/emergency preparedness and management are discussed. Prerequisites: NURS 502, NURS 546, and NURS 547. Corequisite: NURS 549.

NURS 549. Advanced PHN Practicum II. 3 Credits.
This course focuses on implementation of advanced PHN interventions. Corequisite: NURS 548.

NURS 550. Global Public Health Issues. 2 Credits.
This course focuses on population health issues at a global level. Differences in population health status between developing and developed countries are explored. Special emphasis is placed on war as a public health issue and the global impact of AIDS.

NURS 552. Role Development of the CNS. 2 Credits.
Students will compare and contrast the various roles of the clinical nurse specialist and evaluate those roles as they relate to their individual area of practice. Concepts of professional development are emphasized. Prerequisite: NURS 502.

NURS 553. Role Development of the NP. 2 Credits.
This course emphasizes professional role development of the nurse practitioner. Students will compare and contrast the various roles of the nurse practitioner and evaluate those roles as they relate to the student's individual planned area of practice. Prerequisite: NURS 502.

NURS 554. Writing for Publication. 2 Credits.
The course is designed to provide students with knowledge and skills necessary to meet the PhD program requirement and milestone of preparing and submitting a manuscript for publication in a peer-reviewed journal. The achievement of this milestone is foundational for scientific inquiry and the development of nursing scientists. Prerequisite: Consent of Instructor or Advisor. S/U grading. F,S,SS.

NURS 555. Grant Submission. 2 Credits.
The course results in the development and submission of a pre-doctoral, federally-funded research grant proposal, or equivalent with advisor approval. The course builds upon previous doctoral coursework covering grantsmanship and issues in preparing funded research proposals and grant budgets. Prerequisites: NURS 573 and consent of Instructor or Advisor. F,S,SS.

NURS 556. PhD Student Intensive. 1 Credit.
This course submerges the student into a community of scholars during an annual on-campus intensive experience. The student will participate in a variety of presentations, workshops, and activities which focus on development into the role of a nurse scientist and scholar. The course uses a variety of activities which help the student develop into the role of a nurse scientist and scholar. Prerequisite: Admission to the Nursing PhD program. Repeatable to 5 credits. S/U grading. F,S.

NURS 557. Foundations of Nursing Science. 3 Credits.
The epistemology and philosophy of nursing as an art and a science are examined. Patterns of knowing as well as clinical, conceptual, and empirical types of nursing knowledge will be discussed. The development of theory as a knowledge claim is analyzed. Prerequisites: Masters Level Nursing Theory Course and Admission to PhD Program. S.

NURS 558. Research Design. 3 Credits.
This course prepares the doctoral student to understand the link between research design and the study purpose. Prerequisite: Admission to PhD program or consent of instructor. F.

NURS 559. Maternal and Child Health in Primary Care. 2 Credits.
This course focuses on advanced practice nursing care of obstetric and pediatric clients within a primary care setting. An on-campus intensive is required for this course. Prerequisites: Admission to FNP, NURS 510, NURS 511, NURS 523, and NURS 585. SS.

NURS 560. Clinical Anesthesia Practicum I. 5 Credits.
This is the first of five clinical practicum courses that build upon one another and provides students the opportunity to obtain the clinical experiences necessary to develop increasing proficiency in nurse anesthesia practice. The emphasis of this course is the integration of current evidence and advanced nursing knowledge with decision making and case management for diverse, but less complex, patient populations receiving anesthesia care. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S/U grading. S.

NURS 561. Clinical Anesthesia Practicum II. 3 Credits.
This is the second of five clinical practicum courses designed to provide the student with the opportunity to obtain clinical experiences necessary to develop increasing proficiency in nurse anesthesia practice. The emphasis of this course is the integration of current evidence and advanced nursing knowledge with decision making and case management for the diverse and increasingly more complex patient populations receiving anesthesia care. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S/U grading. SS.

NURS 562. Clinical Anesthesia Practicum III. 4 Credits.
This is the third of five clinical practicum courses that builds upon the student with the opportunity to obtain clinical experiences necessary to develop increasing proficiency in nurse anesthesia practice. The emphasis of this course is the integration of current evidence and advanced nursing knowledge with decision making and case management for the diverse and increasingly complex, patient populations receiving anesthesia care. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S/U grading. F,S.

NURS 563. Clinical Anesthesia Practicum IV. 6 Credits.
This is the fourth of five clinical practicum courses that builds upon the student with the opportunity to obtain clinical experiences necessary to develop increasing proficiency in nurse anesthesia practice. The emphasis of this course is the integration of current evidence and advanced nursing knowledge with decision making and case management for diverse patient populations, of all acuity levels, receiving anesthesia care. Emphasis will also be placed on student autonomy, continuing professional role development, and leadership skills. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S/U grading. S.

NURS 564. Psychopharmacology. 2 Credits.
This course provides the advanced practice student with knowledge in the pharmacology of psychopathology across the life span. Emphasis will be placed on the appropriate use of pharmaceuticals for psychiatric disabilities/disorders including: Mood disorders, development disorders, psychotic disorders, anxiety disorders, dementia, and substance abuse. Prerequisite: Admission to PMHNP program or permission of instructor. S.
NURS 565. Rural Populations and Rural Health. 3 Credits.
This course provides an overview of characteristics of rural populations and rural health. Factors that contribute to health, morbidity, and mortality are examined, and the compounded vulnerability of rurality and disadvantaged groups is analyzed. Prerequisite: A graduate level Epidemiology course or permission of instructor. S.

NURS 566. Curriculum Development. 3 Credits.
This course focuses on the curriculum development process. Societal, professional, and institutional factors as well as current research findings influencing the curriculum development process are analyzed. Consideration of the impact of adult learning principles, workplace issues, legal-ethical concerns, and diverse student populations in regard to the curriculum development process is given. Prerequisite: NURS 509.

NURS 567. Teaching Methodologies. 3 Credits.
The course explores theory-based teaching strategies designed to develop cognitive abilities, psychomotor skills, and affective qualities in learners from diverse backgrounds. Strategies and methods for the teaching of nursing content in a variety of settings are utilized. The use of technological tools in nursing education is evaluated. Prerequisite or corequisite: NURS 566.

NURS 568. Teaching Practicum. 2 Credits.
Students assume the role of the nurse educator in selected learning settings under the guidance of a preceptor. A clinical/laboratory component is included. Prerequisites: NURS 566 and NURS 567 and NURS 569, or consent of instructor.

NURS 569. Assessment and Evaluation. 3 Credits.
Principles of assessment, measurement, and evaluation are analyzed in this course as they relate to nursing education. The processes of assessing student learning, teaching, and program outcomes are explored. Topics relevant to the evaluation of individual student learning such as test development, evaluation of critical thinking, and clinical evaluation are included. The processes of faculty and program evaluation are examined. Prerequisites: NURS 566 and NURS 567, or consent of instructor.

NURS 572. Diverse Vulnerable Populations. 3 Credits.
Students will explore a wide range of concepts as they apply to diverse and vulnerable populations. The focus of the course is on understanding concepts and principles important to nursing when doing research, planning health care, developing health policy, and teaching in this area. Prerequisite: Admission to the Nursing Graduate Program or consent of the instructor.

NURS 573. Research Funding. 3 Credits.
This course integrates the scientific and practical aspects of professional writing and grant proposal development to obtain funds for research. Prerequisite: Admission to the graduate nursing program or approval of instructor. Prerequisite or Corequisite: NURS 574 and/or NURS 575; Non-nursing programs: Graduate level quantitative and/or qualitative research methods coursework required. F.

NURS 574. Quantitative Nursing Methods. 3 Credits.
The purpose of this course is to acquire knowledge and skills necessary to apply quantitative research methods in nursing. The course includes substantial applications of established methodologies and effective research techniques within the quantitative paradigm. Prerequisite: Admission to the doctoral program and completion of a multivariate statistics course. S.

NURS 575. Qualitative Nursing Research. 3 Credits.
This course focuses on examination and analysis of qualitative research designs with particular emphasis on approaches relevant to phenomena in nursing. Students will conduct fieldwork to develop some beginning qualitative research skills. Prerequisite or Corequisite: Admission to Doctoral Program or consent of instructor. F.

NURS 576. Clinical Anesthesia Practicum. 5 Credits.
This is the final capstone clinical practicum course that provides the student with the opportunity to develop full autonomy and proficiency in nurse anesthesia practice. The emphasis of this course is the integration of current evidence and advanced nursing knowledge with advanced clinical judgement, well developed clinical decision making, and total case management for diverse patient populations receiving anesthesia care. Professionalism and leadership within healthcare systems will be emphasized. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S/U grading. SS.

NURS 577. Rural Healthcare Ethics. 3 Credits.
This course is directed toward the development of critical dialogue and leadership strategies for dealing with ethical issues related to nursing, health care and research. Commitment to discussion, understanding and acceptance of the rights of others in dilemmas is emphasized. Reflexive nursing, which brings attention to one's own position and objectivity, is encouraged. The challenges of ethics in rural milieus are included in the discourse. Prerequisite: Admission to the Nursing doctoral Program or consent of the instructor. S.

NURS 578. Doctoral Seminar. 1 Credit.
Prerequisite: Admission to the Nursing doctoral Program or consent of the instructor.

NURS 580. Research Practicum. 1-6 Credits.
The doctoral research practicum provides a research experience for doctoral nursing students separate from the dissertation to participate in the research process under the guidance of an experienced-funded investigator. Experiences may include grant writing, data collection, analysis, and manuscript writing. Repeatable to 6 credits. F,S,SS.

NURS 581. The Nurse Scientist. 3 Credits.
This course prepares the doctoral student to actively engage in doctoral study with knowledge of the discipline of nursing and skills that facilitate success as an emerging nurse scientist. Prerequisite: Admission to PhD program. F.

NURS 583. Individual Therapy. 2 Credits.
This course provides knowledge and skill development in the implementation of evidence-based clinical therapies and treatments focused on the individual including cultural variations. Includes clinical practice. Prerequisites or corequisites: NURS 500, NURS 502, NURS 510, NURS 511, NURS 514, NURS 523, NURS 535, NURS 538, NURS 539, and NURS 585.

NURS 584. Group and Family Therapies. 3 Credits.
Evidence-based clinical interventions with diverse groups and families are presented. Opportunities for clinical implementation accompany the theoretical models. A clinical/laboratory component is included. Prerequisites or corequisites: NURS 538, NURS 583 and admission into Psychiatric Mental Health specialization or consent of instructor.

NURS 585. Advanced Health Assessment. 3 Credits.
An evidenced-based approach will be used to present methodologies for graduate student performance on health histories, developmental assessments, and physical/psychosocial assessments of individuals. Communication and interviewing techniques for advanced nursing practice are applied. A clinical/laboratory component is included with variations for Family Nurse Practitioner, Psych/Mental Health, Adult-Gerontology, and Nurse Anesthesia students. An on-campus intensive is required for this course. Prerequisite: Completion of an undergraduate course in health assessment techniques or consent of instructor. Prerequisite or corequisite: NURS 510. F.

NURS 586. Rural Health Programs and Research. 3 Credits.
This course focuses on policies, programs and research related to rural health. Prerequisite: NURS 565 and NURS 558 or consent of instructor. F.

NURS 588. Management of Psychopathology I. 2 Credits.
This is the first of a two course sequence that focuses on the management of individuals across the lifespan, groups and families with or affected by psychopathology. Continuity of care across settings and community are emphasized. Prerequisites or Corequisites: NURS 564, NURS 584, and admission to the PMHNP program.

NURS 589. Management of Psychopathology II. 2 Credits.
This is the second of a two course sequence that focuses on the management of individuals across the lifespan, groups and families with or affected by psychopathology. Management of co-morbidities is emphasized. Prerequisite or Corequisite: NURS 588. S.

NURS 590. Directed Studies. 1-3 Credits.
Designed to meet the needs of individual and/or small groups of graduate students. The course content will be based on student interests and needs in conjunction with the faculty member's area of specialization. Prerequisite: Consent of instructor. Repeatable.

NURS 591. Readings in Nursing. 1-3 Credits.
Readings in selected nursing/health care topics with written and/or oral reports. Prerequisite: Consent of instructor. Repeatable.
NURS 592. Advanced PHN Practicum III. 4 Credits.
This course provides a capstone experience in Advanced PHN practice. Students are expected to integrate knowledge from all of their previous coursework into an applied practicum experience in population health, to evaluate population health interventions and programs, and develop strategies for program funding. Prerequisites: NURS 548 and NURS 549.

NURS 593. DNP Internship I. 4 Credits.
This first DNA Internship course is designed to provide the DNA Advanced Practice Nurse (APN) student with opportunities to apply the concepts in the AACN DNA Essentials document in the practice environment. Students will also begin development of the DNA capstone project. Corequisite: NURS 598.

NURS 594. DNP Internship II. 4 Credits.
This course is designed to provide the DNP student with additional practice focused learning opportunities to apply the concepts in the AACN DNA Essentials document in the practice environment. The student will complete and disseminate findings from the capstone project. Prerequisite: NURS 593. Corequisite: NURS 599.

NURS 595. DNP Internship III. 4 Credits.
This course is designed to provide the DNP APN with additional practice focused learning opportunities to apply the concepts in the AACN DNA Essentials document in the practice environment. The student will complete the DNP capstone project and disseminate findings in presentations and publications. Prerequisites: NURS 593 and NURS 594. Corequisite: NURS 596.

NURS 597. Advanced Clinical Practicum. 1-12 Credits.
This clinical practicum course provides the student with the opportunity to obtain extended clinical experience in the area of specialization. The course focuses on the integration of theoretical knowledge into clinical practice. A clinical/laboratory component is included. Prerequisite: Completion of NURS 517 for Nurse Anesthesia specialization or completion of first year curriculum for the Family Nurse Practitioner, Psychiatric/Mental Health or Gerontology specializations. Repeatable. S/U grading.

NURS 600. Integrated DNP Core Concepts I. 3 Credits.
This course is an exploration of the core concepts that support the varying roles of the DNP prepared APRN as a practice focused leader and clinical scholar. Development of practice focused leadership skills in the care of rural and vulnerable populations will also be addressed. Prerequisite: Admission to the DNP Program. F.

NURS 601. Integrated DNP Core Concepts II. 3 Credits.
This course builds upon content covered in Integrated DNP Core Concepts I. Students continue to explore core concepts that support the varying roles of the role of the DNP prepared APRN practice focused leader and clinical scholar. In addition, students will critically examine the historical evolution of epidemiology and epidemiological concepts relevant in advanced nursing practice. Prerequisites: Admission to the DNP Program and NURS 600. S.

NURS 602. Evidence Based Research I. 3 Credits.
This course focuses on the development of practice scholarship through the use of evidence to address clinical problems and inform future practice. Students in the class will define practice problems, evaluate evidence based methods to address those problems and design practice focused projects to measure outcomes. Middle range theories will also be explored and used as frameworks for study designs. Statistics and previous Evidence Based Practice course is highly recommended. Prerequisite or Corequisite: Admission to the DNP program. F.

NURS 603. Evidence-Based Research II. 3 Credits.
This course focuses on the continued development of the practice scholar and includes content of research and program evaluation methods and analysis used to address practice problems and inform future evidence based practice. Prerequisite: NURS 602. Corequisite: NURS 609. S.

NURS 604. Health Informatics. 3 Credits.
This course prepares the health care professional to use and evaluate emerging health care technology and data systems to support evidence-based practice. Prerequisite: Admission to DNP Program or consent of instructor. SS.

NURS 605. Health Policy. 2 Credits.
This course will prepare the health care professional to understand and apply knowledge of health policy to function as an advocate for populations and individuals. Prerequisite: Admission to the DNP Program or consent of instructor. SS.

NURS 606. DNP Systems Focused Practice I. 2 Credits.
This course is designed to provide the DNP student with opportunities to apply the concepts in the AACN DNP Essentials in the practice environment. Prerequisite: NURS 603. SS.

NURS 607. DNP Systems Focused Practice II. 3 Credits.
This course continues to provide the DNP student with opportunities to apply the concepts in the AACN DNP Essentials in the practice environment. Prerequisites: NURS 603 and NURS 606. F.

NURS 608. Healthcare Economics, Finance and Leadership. 3 Credits.
This course focuses on healthcare economics, finance and practice leadership skills related to the role of the DNP prepared advanced practice nurse within the complex health care system. Prerequisite or Corequisite: Admission to the DNP program or consent of instructor. F.

NURS 609. DNP Project Teams. 1-6 Credits.
The student will design, implement and evaluate the DNP project as well as present findings in the applicable practice setting under the guidance of DNP faculty. Prerequisite: NURS 603. Repeatable to 6 credits. F,S,SS.

NURS 610. DNP Capstone. 2 Credits.
The capstone course provides the DNP students with an opportunity to develop skills in reporting and disseminating practice focused research findings. Writing for publication of practice focused research is emphasized. Prerequisite or Corequisite: NURS 609. S,SS.

NURS 611. Rural Healthcare Forum. 1 Credit.
This course focuses on interprofessional healthcare delivery to rural and underserved populations. Prerequisite or Corequisite: Admission to DNP program or consent of instructor. SS.

NURS 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

NURS 997. Independent Study. 2 Credits.

NURS 998. Thesis. 1-4 Credits.
Repeatable to 4 credits.

NURS 999. Dissertation. 1-15 Credits.
Repeatable to 15 credits.

Nurse Anesthesia

M.S. in Nurse Anesthesia (p. 491)

Courses

NURS 500. Theories/Concepts Nursing. 3 Credits.
The focus of this core course is on analysis of current nursing and related theories and concepts which guide clinical practice, curriculum development, research, and nursing administration.

NURS 502. Evidence for Practice. 3 Credits.
This course emphasizes the application of basic research concepts to the building of evidence-based practice in nursing. Advanced competencies are developed in searching and evaluating the literature, examining the merit of different types and levels of evidence, and analyzing the generalizability and implications for clinical practice. Prerequisites or Corequisites: Admission to one of the Graduate Nursing Tracks, NURS 500 and statistics and/or permission of instructor. F,S.

NURS 503. The Business of Practice. 2 Credits.
This course focuses on the business aspects of Inter-professional advanced practice in the complex health care environment. Prerequisite: Admission to the DNP Program.

NURS 504. Advanced Pharmacology I. 3 Credits.
Pharmacodynamic and pharmacokinetic principles with a focus on clinical anesthesia practice. Physiologic systems and drug classifications are used; emphasis on therapeutic use, side effects, drug interactions, and contraindications of drugs used for intravenous anesthesia induction, inhalation, and balanced anesthesia maintenance. Pediatric and geriatric variations will be addressed. Prerequisite: Admission to Nurse Anesthesia Specialization.
NURS 505. Advanced Pharmacology. 3 Credits.
The focus of this course is on the basic and advanced clinical concepts of pharmacology for the advanced practice nurse. Medication selection and administration will be addressed. Anatomy, physiology, and pathophysiology will be reviewed as appropriate to the physiologic system or medication class being discussed. Evidence-based guidelines with respect to the clinical application of medications utilized in selected acute and chronic health problems will be explored. Prerequisite or Corequisite: Admission to Graduate Nursing Program. F.

NURS 506. Advanced Pharmacology II. 3 Credits.
Advanced pharmacology for clinical nurse anesthesia practice. Prerequisite: NURS 504.

NURS 507. Anesthesia Seminar and Clinical Practicum. 4 Credits.
This course is designed to provide nurse anesthesia students an overview of the basic principles and skills needed to care for the routine surgical patient. Topics include difficult airway management, patient monitoring, patient preparation, positioning, patient safety, fluid and electrolyte management, documentation of anesthesia care, and an introduction to regional anesthesia. Analysis, integration, and utilization of research to improve practice is emphasized. The lecture content is reinforced through Clinical Simulation and laboratory experiences, allowing for immediate application of the lecture content and integration into the clinical setting. Students are introduced to the clinical setting through observational and hands-on experiences. Includes a clinical and/or laboratory component. Prerequisite: NURS 521.

NURS 508. Nurse Anesthesia Review Course. 1 Credit.
This course is faculty guided and designed to assist students with their review of nurse anesthesia course and clinical material in preparation for the CCNA certification examination. Prerequisite: Completion of all Nurse Anesthesia Specialization coursework.

NURS 509. Foundations for Nurse Education. 3 Credits.
This course begins to compare and contrast multiple roles and responsibilities of nurse educators in various settings in academic and health service. It will build the conceptual foundation for educational processes with emphasis on ethics, learning theories, taxonomies of learning and current evidence necessary for development of competencies necessary for the practice of educating. Students will begin to formulate their individual philosophy of teaching and learning. Prerequisite: Admission to the Nursing Graduate Program or consent of the instructor. Prerequisite or Corequisite: NURS 500. S.

NURS 510. Adv Physiology/Pathophysiology I. 3 Credits.
Normal physiologic functions associated with cellular structure and environment. Physiologic and pathophysiologic functions of the human body and its organ systems, both separately and integrated in whole activities. Prerequisite: Admissions to graduate study.

NURS 511. Adv Physiology/Pathophysiology II. 3 Credits.
Physiologic and pathophysiologic functions of the human body and its organ systems, both separately and integrated in whole activities. Prerequisite: NURS 510 or consent of instructor.

NURS 512. DNP Core Concepts I. 2 Credits.
This course is an exploration of the core concepts that support the developing role of the DNP as a practice focused leader and researcher. Prerequisite: Admission to the DNP Program.

NURS 513. DNP Core Concepts II. 2 Credits.
This course focuses on the concepts that support the development of the role of the DNP practice leader in the care of rural and vulnerable populations and issues related to planning and providing care for vulnerable and underserved populations. The primary content focus areas are epidemiology and vulnerability related to population and individual health. Prerequisites: Admission to the DNP Program and NURS 512. S.

NURS 514. Essentials in Epidemiology. 3 Credits.
This course will emphasize the application of the principles of epidemiology as applied to the investigation and prevention of individual and population health problems. Students will evaluate care delivery models and analyze epidemiological data to develop and apply strategies for health promotion and disease prevention for individuals, aggregates, and populations. The core competencies will focus not only on the practice of public health, but also enhance practice for the clinician. Prerequisite: Admission to the Graduate School, MPH Program, or permission of the the instructor. F.S.

NURS 515. Basic Principles of Anesthesia Practice I. 3 Credits.
This course provides an introduction to the fundamental principles necessary for the safe, professional, and individualized anesthetic care of diverse patients. Foundational concepts such as chemistry and physics as they apply to anesthesia practice, pharmacology of anesthetic agents, uncomplicated airway management, anesthesia delivery systems, and physiological monitoring will be investigated. Low and high fidelity patient simulation will be utilized to develop the student's cognitive and psychomotor skills which are essential to clinical anesthesia management. The course will conclude with a clinical component designed to acclimate beginning nurse anesthesia students to the clinical anesthesia arena. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. F.

NURS 516. Basic Principles of Anesthesia Practice II. 3 Credits.
This course builds upon the fundamentals covered in Basic Principles of Anesthesia I, all of which are necessary for the safe, professional, and individualized anesthetic care of diverse patients. Concepts such as basic periparative anesthetic management, pain management, regional anesthesia, difficult airway management, effective oral and written communication, and patient and healthcare provider safety are emphasized. Low and high fidelity patient simulation will be utilized to develop the student's cognitive and psychomotor skills which are essential to clinical anesthesia management. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S.

NURS 517. Anesthesia Seminar and Clinical Practicum II. 5 Credits.
This course builds on the foundations learned in the prerequisite course. Advanced anesthesia principles are applied to various patient populations including the surgical patient with cardiovascular and respiratory diseases. Anesthesia care of other surgical populations including the trauma, orthopedic, urological, vascular, intra-abdominal and ENT patient will be explored. Important concepts include anatomical, physiological and pathophysiologic, and pharmacological principles. Analysis, integration, and utilization of research to improve practice is emphasized. The lecture content is reinforced through simulated laboratory experiences, allowing for immediate application of the lecture content and integration into the clinical setting. A clinical rotation is included. Prerequisite: NURS 507.

NURS 518. Pharmacotherapeutics for Nurse Anesthesia. 2 Credits.
The focus of this course is on advanced clinical concepts of pharmacology relevant to the nurse anesthetist during the periparative period. This course utilizes concepts from NURS 505 Advanced Pharmacology and further advances the student's knowledge in pharmacological concepts related to the practice of anesthesia. This course will examine the clinical application of anesthesia specific pharmacologic principles into formulating anesthetic plans for diverse patient populations. Prerequisite or Corequisite: NURS 505; Admission to the DNP Program - Nurse Anesthesia Track. S.

NURS 519. Practice Leadership. 2 Credits.
This course focuses on practice leadership theories and strategies related to the role of the DNP advanced practice nurse within the complex health care system. Prerequisite: Admission to DNP Program or consent of instructor.

NURS 520. Prof Role Devpmnt/Nurse Anesthesia. 3 Credits.
The focus of this course is on the identification and analysis of the professional components of nurse anesthesia practice, emphasizing role development; management and leadership; medical, ethical and legal responsibilities; the provision of culturally competent care; and scope of professional practice. Other areas that will be explored include quality improvement, the legislative process, credentialing, professional organizations, conflict resolution, and self-care and stress management for the anesthetist. An in-depth analysis of current trends and issues affecting healthcare and the delivery of anesthesia services are included in the course content. Prerequisites: NURS 521 and NURS 507. Corequisite: NURS 517.

NURS 521. Foundations of Anesthesia Practice. 3 Credits.
This course provides the foundation for nurse anesthesia practice. Lecture and discussion begin with an analysis of the history of anesthesia nursing, professionalism, and standards of care for the anesthetist. Safety in the nurse anesthesia environment will be emphasized. Additional content includes the applied chemical, physical, and biochemical concepts as they relate to anesthesia practice, including the mechanisms of anesthesia, medical emergencies, medical gas systems, laws governing gases, the anesthesia machine, monitoring principles and equipment, airway equipment and basic airway management, and universal precautions. Prerequisite: Admission to the Nurse Anesthesia Specialty.
NURS 522. Advanced Pathophysiology. 3 Credits.
This course presents a system-focused approach to alterations in normal physiological mechanisms that result in pathologic disease processes. Physiological changes are compared and contrasted over the lifespan and developmental cellular physiology, pathogenesis and clinical manifestations commonly observed in altered health states are reviewed. This knowledge serves as the foundation for advanced clinical assessment, decision making and management for the advanced practice nurse. Prerequisite: Admission to graduate study. F,S,SS.

NURS 523. Health Promotion. 3 Credits.
Paradigms in health promotion, health detection, and disease prevention across the lifespan are used in synthesis in theory and evidence-based primary care interventions. Prerequisite: Admission to the Nursing Graduate Program or consent of the instructor. F,S.

NURS 524. Anatomy for Nurse Anesthetists. 1 Credit.
This course builds upon the concepts and fundamentals of Basic Principles of Anesthesia I and II as it relates to the detailed regional anatomy of the human body. A cadaver laboratory experience will be utilized throughout the course to develop the student's understanding of clinical anatomy related to the airway, central nervous system, peripheral nerves, cardiovascular system, and pulmonary system with an anesthesia context. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S.

NURS 525. Applied Multivariate Statistics. 3 Credits.
Principles, assumptions and applications of major multivariate statistical techniques commonly used in nursing and clinical health research. Prerequisite: Graduate level univariate statistics and admission to the Nursing Doctoral Program or consent of the instructor. F.

NURS 526. Ethical, Legal and Health Policy Issues. 3 Credits.
This course emphasizes health policy issues within the context of legal and ethical concepts. Students will examine and debate health policies in current practice, thus broadening their ability to analyze, implement, and evaluate health policy issues. F,S.

NURS 527. Anesthesia Seminar and Clinical Practicum III. 5 Credits.
This course further builds on the foundations learned in prerequisite courses. Students will incorporate previously learned anatomy, physiology, pathophysiology, and patient management into the care of subspecialty patients and patients with complex co-existing diseases. Advanced anesthesia principles are applied to the OB, pediatric, geriatric, and neuro patient. The pharmacology and anesthesia management of these subspecialty populations and patients with various disease states, such as kidney, musculoskeletal, and endocrine disorders, will be explored. Analysis, integration, and utilization of research to improve clinical practice is emphasized. The lecture content is reinforced with a clinical experience that emphasizes anesthesia care for subspecialty populations. A clinical/laboratory component is included. Prerequisite: NUR 517.

NURS 528. Advanced Principles of Anesthesia Practice I. 4 Credits.
This course builds upon the nurse anesthesia foundations covered previously in the Basic Principles of Anesthesia I and II courses. An evidence based approach to the anesthetic evaluation, planning, and management of diverse and increasingly complex patient populations, such as those with pre-existing respiratory, cardiac, and renal diseases, will be the focus. The hands-on administration of safe, individualized, and comprehensive anesthetic plans of care to both simulated and actual patients will be introduced and emphasized. Low and high fidelity patient simulation will be utilized to continue developing the student's cognitive and psychomotor skills which are essential to perform clinical anesthesia management. A clinical component will allow the student to apply theoretical principles to nurse anesthesia practice and to increase their clinical skills, knowledge, and autonomy. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. F,S,SS.

NURS 529. Advanced Principles of Anesthesia Practice II. 6 Credits.
This course builds on the foundations covered in Basic Principles of Anesthesia I and II along with Advanced Principles I including the evaluation, planning, and management of diverse and increasingly complex patient populations. Evidence-based advanced principles of anesthesia care will be investigated in order to construct and implement comprehensive and individualized anesthetic plans of care for the management of subspecialty patients. Obstetrical and pediatric populations, as well as patients with complex co-existing diseases and/or those undergoing complex surgical procedures will be the focus. Low and high fidelity patient simulation will be utilized to continue developing the student’s cognitive and psychomotor skills which are essential to perform clinical anesthesia management. A clinical component will allow the student to apply theoretical principles to nurse anesthesia practice and to increase their clinical skills, knowledge, and autonomy. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. F.

NURS 530. Research Design & Methods in Nursing. 3 Credits.
Prerequisite or corequisite: NURS 500 or consent of instructor.

NURS 531. Adult-Gerontology Illness Management I. 3 Credits.
This is the first of a two-course sequence that focuses on evidenced-based primary care diagnosis and management of common episodic/chronic problems encountered by young adults, adults and older adults and their social network in ambulatory, inpatient, and community settings. Physiological, psychosocial, and pharmacological interventions are integrated into the holistic care that incorporates age-related, cultural, family, and community variations. An on-campus intensive is required for this course. Prerequisites: NURS 511 and NURS 585. Corequisite: NURS 597. F.

NURS 532. Family Centered Advanced Practice Nursing. 3 Credits.
Theoretical and scientific foundations for advanced practice nursing care for the family-as-a-unit in health and illness across the lifespan. Prerequisite: Admission to DNP program or consent of instructor. S.

NURS 533. Adult-Gerontology Illness Management II. 3 Credits.
This is the second of a two-course sequence that focuses on evidenced-based primary care diagnosis and management of common episodic/chronic problems encountered by young adults, adults and older adults and their social network in ambulatory, inpatient, and community settings. Physiological, psychosocial, and pharmacological interventions are integrated into the holistic care that incorporates age-related, cultural, family, and community variations. An on-campus intensive is required for this course. Prerequisite: NURS 531. Corequisite: NURS 597. S.

NURS 534. Management of Health Conditions in Primary Care I. 3 Credits.
This is the first of a two-course sequence that focuses on evidenced-based primary care diagnosis and management of common episodic/chronic problems encountered by adults, including young adults, middle aged adults and older adults and their social network in ambulatory, inpatient, and community settings. Physiological, psychosocial, and pharmacological interventions are integrated into the holistic care that incorporates age-related, cultural, family, and community variations. Prerequisites: NURS 522 and NURS 585. Corequisite: NURS 597 (II). F,S,SS.

NURS 535. Advanced Pharmacology for Primary Care I. 2 Credits.
Pharmacological agents utilized to treat common acute and chronic health problems are explored in depth. The course focus is on advanced nurse practice roles related to prescription, pharmacological, and therapeutic applications of the drugs. Prerequisite: Admission to the Nursing Graduate Program or consent of the instructor. Prerequisite or corequisite: NURS 510. F,S.

NURS 536. Advanced Nurse Educator Practice of Health Promotion. 2 Credits.
This practicum course affords the Nurse Educator student with opportunities to develop advanced skills in teaching-learning practices in the rural health care environments. The student will apply educational theories and best-evidence teaching strategies with a particular emphasis in education related to health promotion strategies. This course will include topics such as the Nurse Educator role to promote health in rural communities, assess health literacy, and develop appropriate patient educational materials. The practicum emphasizes health promotion education to meet diverse needs of rural dwelling patients, families and groups. Prerequisites: NURS 500, NURS 511, NURS 539, and NURS 514. Corequisite: NURS 526, and NURS 569. F.
NURS 537. Graduate Cooperative Education. 1-2 Credits.
The course focus is upon experience in advanced nursing practice integrating theory, research, and advanced practice in a specific area of nursing. Course overview: the purpose of this course is to provide the graduate nursing student with advanced nursing practice as an employee in a health care agency to and evaluate that experience in relation to the educational program. A clinical/ laboratory component is included. Prerequisite: Permission of Graduate Director of Nursing. Repeatable to 9 credits.

NURS 538. Psych Diagnostic Reasoning. 2 Credits.
This course prepares students for advanced therapeutic communication, interviewing, and assessment of people with mental illness across the life span. Skills are developed in differential diagnoses of psychopathology within the scope and standards of advanced psychiatric mental health nursing practice. Clinical application is included. Prerequisite: Acceptance into the PMHNP program or permission of instructor. S.

NURS 539. Advanced Pharmacology for Primary Care II. 2 Credits.
Pharmacological agents utilized to treat common acute and chronic health problems are explored in depth. The course focus is on advanced nursing practice roles related to prescription, pharmacological, and therapeutic applications of the drugs. Prerequisite: Admission to nursing graduate program and NURS 535 or consent of instructor. F.S.

NURS 540. Management of Health Conditions in Primary Care II. 3 Credits.
Clinical decision making skills are developed in the diagnosis and management of acute and chronic health conditions throughout the lifespan. Health promotion, health protection, and disease prevention are emphasized. Prerequisite: NURS 534. F,S,SS.

NURS 541. Illness Management - Adult Gerontology I. 3 Credits.
This is the first of a two-course sequence focusing on evidence-based primary care specific to the adult-gerontology population which includes adolescents, young adults and frail, older adults. This course prepares students to provide healthcare services across the adult-gerontology age spectrum from wellness to illness, using scientific knowledge and theoretical foundations to differentiate between normal and abnormal changes in physiological, psychological and sociological development and aging. Students will develop strategies to provide and coordinate interdisciplinary and holistic care that incorporates age-related, cultural, family, and community variables. Prerequisites: NURS 522, NURS 585, and NURS 597 (I). Corequisite: NURS 597 (II). F,S,SS.

NURS 542. Professional Aspects of Nurse Anesthesia Practice. 3 Credits.
This course provides the entry-level nurse anesthesia student with a foundational knowledge of professional aspects related to nurse anesthesia practice. The focus of this course is on historical perspectives, professional role development, anesthesia business practices, and professional wellness. Prerequisite: Admission to the DNP Program - Nurse Anesthesia Track. F.

NURS 543. Illness Management - Adult Gerontology II. 3 Credits.
This is the second of a two-course sequence that focuses on evidence-based primary care specific to the adult-gerontology population which includes adolescents and young adults to frail, older adults. Course work focuses on evidence based acute and chronic care diagnosis and management of common episodic acute and chronic problems encountered by the adult-gerontology population. Physiological, psychosocial, and pharmacological assessments, including changes associated with aging and development across the adolescent - adult continuum are integrated into the formation of differential diagnosis and interventions of clinical problems in collaboration with other care providers. Prerequisites: NURS 541 and NURS 597 (II). Corequisite: NURS 597 (III). F,S,SS.

NURS 544. Pharmacotherapeutics for Primary Care. 2 Credits.
This course will help prepare the advance practice nursing student for prescriptive authority. Topics will focus on decision making regarding the pharmacological management of common acute and chronic illnesses encountered in primary care settings. Pharmacokinetics, pharmacodynamics, adverse drug reactions, and contraindications will be discussed. Ethical and legal principles of writing prescriptions will also be covered. Students will synthesize research findings related to various medications using case study and discussion. Prerequisites: Admission to DNP program (FNP, AGNP tracks), and NURS 505. S.

NURS 545. Care of the Frail Older Adult. 3 Credits.
In this course the advanced practice nursing student will focus on the complex and multifactorial health care needs of frail elders. Students will develop strategies to provide and coordinate interdisciplinary and holistic care of the frail elderly in a variety of settings. Prerequisite: Admission to DNP program or consent of instructor. S.

NURS 546. Advanced PHN I. 4 Credits.
NURS 546 introduces concepts foundational to advanced PHN practice and population health. Corequisite: NURS 547.

NURS 547. Advanced PHN Practicum I. 4 Credits.
The focus of this course is on application of foundational concepts of Advanced PHN practice. Students will conduct a community assessment and identify community problems and strengths. Written and oral communication skills are emphasized. Corequisite: NURS 546.

NURS 548. Advanced PHN II. 3 Credits.
This course focuses on the leadership role of advanced PHN practice. Public health and community-based organizational assessment, program monitoring and evaluation, quality improvement, and management of multiple projects are emphasized. Concepts of leadership in public and community health and collaborative interdisciplinary practice are discussed. Health policy and law and ethics as they relate to public health are explored. In addition, advanced PHN leadership in rural areas and in disaster/emergency preparedness and management are discussed. Prerequisites: NURS 502, NURS 546, and NURS 547. Corequisite: NURS 549.

NURS 549. Advanced PHN Practicum II. 3 Credits.
This course focuses on implementation of advanced PHN interventions. Corequisite: NURS 548.

NURS 550. Global Public Health Issues. 2 Credits.
This course focuses on population health issues at a global level. Differences in population health status between developing and developed countries are explored. Special emphasis is placed on war as a public health issue and the global impact of AIDS.

NURS 552. Role Development of the CNS. 2 Credits.
Students will compare and contrast the various roles of the clinical nurse specialist and evaluate those roles as they relate to their individual area of practice. Concepts of professional development are emphasized. Prerequisite: NURS 502.

NURS 553. Role Development of the NP. 2 Credits.
This course emphasizes professional role development of the nurse practitioner. Students will compare and contrast the various roles of the nurse practitioner and evaluate those roles as they relate to the student's individual planned area of practice. Prerequisite: NURS 502.

NURS 554. Writing for Publication. 2 Credits.
The course is designed to provide students with knowledge and skills necessary to meet the PhD program requirement and milestone of preparing and submitting a manuscript for publication in a peer-reviewed journal. The achievement of this milestone is foundational for scientific inquiry and the development of nursing science. Prerequisite: Consent of Instructor or Advisor. S/U grading. F,S,SS.

NURS 555. Grant Submission. 2 Credits.
The course results in the development and submission of a pre-doctoral, federally-funded research grant proposal, or equivalent with advisory approval. The course builds upon previous doctoral coursework covering grantsmanship and issues in preparing funded research proposals and grant budgets. Prerequisites: NURS 573 and consent of Instructor or Advisor. F,S,SS.

NURS 556. PhD Student Intensive. 1 Credit.
This course submurses the student into a community of scholars during an annual on-campus intensive experience. The student will participate in a variety of presentations, workshops, and activities which focus on development into the role of a nurse scientist and scholar. The course uses a variety of activities which help the student develop into the role of a nurse scientist and scholar. Prerequisite: Admission to the Nursing PhD program. Repeatable to 5 credits. S/U grading. F.S.

NURS 557. Foundations of Nursing Science. 3 Credits.
The epistemology and philosophy of nursing as an art and a science are examined. Patterns of knowing as well as clinical, conceptual, and empirical types of nursing knowledge will be discussed. The development of theory as a knowledge claim is analyzed. Prerequisites: Masters Level Nursing Theory Course and Admission to PhD Program. S.

NURS 558. Research Design. 3 Credits.
This course prepares the doctoral student to understand the link between research design and the study purpose. Prerequisite: Admission to PhD program or consent of instructor. F.
NURS 559. Maternal and Child Health in Primary Care. 2 Credits.
This course focuses on advanced practice nursing care of obstetric and pediatric clients within a primary care setting. An on-campus intensive is required for this course. Prerequisites: Admission to FNP, NURS 510, NURS 511, NURS 523, and NURS 585. SS.

NURS 560. Clinical Anesthesia Practicum I. 5 Credits.
This is the first of five clinical practicum courses that build upon one another and provides students the opportunity to obtain clinical experiences necessary to develop increasing proficiency in nurse anesthesia practice. The emphasis of this course is the integration of current evidence and advanced nursing knowledge with decision making and case management for diverse, but less complex, patient populations receiving anesthesia care. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S/U grading. S.

NURS 561. Clinical Anesthesia Practicum II. 3 Credits.
This is the second of five clinical practicum courses designed to provide the student with the opportunity to obtain clinical experiences necessary to develop increasing proficiency in nurse anesthesia practice. The emphasis of this course is the integration of current evidence and advanced nursing knowledge with decision making and case management for the diverse, increasingly complex, patient populations receiving anesthesia care. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S/U grading. SS.

NURS 562. Clinical Anesthesia Practicum III. 4 Credits.
This is the third of five clinical practicum courses that provides the student with the opportunity to obtain clinical experiences necessary to develop increasing proficiency in nurse anesthesia practice. The emphasis of this course is the integration of current evidence and advanced nursing knowledge with decision making and case management for diverse patient populations, of all acuity levels, receiving anesthesia care. Emphasis will also be placed on student autonomy, continuing professional role development, and leadership skills. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S/U grading. F.

NURS 563. Clinical Anesthesia Practicum IV. 6 Credits.
This is the fourth of five clinical practicum courses that provides the student with the opportunity to obtain clinical experiences necessary to develop increasing proficiency in nurse anesthesia practice. The emphasis of this course is the integration of current evidence and advanced nursing knowledge with decision making and case management for diverse patient populations, of all acuity levels, receiving anesthesia care. Emphasis will also be placed on student autonomy, continuing professional role development, and leadership skills. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S/U grading. F.

NURS 564. Psychopharmacology. 2 Credits.
This course provides the advanced practice student with knowledge in the pharmacology of psychopathology across the life span. Emphasis will be placed on the appropriate use of pharmaceuticals for psychiatric disabilities/disorders including: Mood disorders, development disorders, psychotic disorders, anxiety disorders, dementia, and substance abuse. Prerequisite: Admission to PMHPN program or permission of instructor. S.

NURS 565. Rural Populations and Rural Health. 3 Credits.
This course provides an overview of characteristics of rural populations and rural health. Factors that contribute to health, morbidity, and mortality are examined, and the compounded vulnerability of rurality and disadvantaged groups is analyzed. Prerequisite: A graduate level Epidemiology course or permission of instructor. S.

NURS 566. Curriculum Development. 3 Credits.
This course focuses on the curriculum development process. Societal, professional, and institutional factors as well as current research findings influencing the curriculum development process are analyzed. Consideration of the impact of adult learning principles, workforce issues, legal-ethical concerns, and diverse student populations in regard to the curriculum development process is given. Prerequisite: NURS 509.

NURS 567. Teaching Methodologies. 3 Credits.
The course explores theory-based teaching strategies designed to develop cognitive abilities, psychomotor skills, and affective qualities in learners from diverse backgrounds. Strategies and methods for the teaching of nursing content in a variety of settings are utilized. The use of technological tools in nursing education is evaluated. Prerequisite or corequisite: NURS 566.

NURS 568. Teaching Practicum. 2 Credits.
Students assume the role of the nurse educator in selected learning settings under the guidance of a preceptor. A clinical/laboratory component is included. Prerequisites: NURS 566 and NURS 567 and NURS 569, or consent of instructor.

NURS 569. Assessment and Evaluation. 3 Credits.
Principles of assessment, measurement, and evaluation are analyzed in this course as they relate to nursing education. The processes of assessing student learning, teaching, and program outcomes are explored. Topics relevant to the evaluation of individual student learning such as test development, evaluation of critical thinking, and clinical evaluation are included. The processes of faculty and program evaluation are examined. Prerequisites: NURS 566 and NURS 567, or consent of instructor.

NURS 572. Diverse Vulnerable Populations. 3 Credits.
Students will explore a wide range of concepts as they apply to diverse and vulnerable populations. The focus of the course is on understanding concepts and principles important to nursing when doing research, planning health care, developing health policy, and teaching in this area. Prerequisite: Admission to the Nursing Graduate Program or consent of the instructor.

NURS 573. Research Funding. 3 Credits.
This course integrates the scientific and practical aspects of professional writing and grant proposal development to obtain funds for research. Prerequisite: Admission to the graduate nursing program or approval of instructor. Prerequisite or Corequisite: NURS 574 and/or NURS 575; Non-nursing programs: Graduate level quantitative and/or qualitative research methods coursework required. F.

NURS 574. Quantitative Nursing Methods. 3 Credits.
The purpose of this course is to acquire knowledge and skills necessary to apply quantitative research methods in nursing. The course includes substantial applications of established methodologies and effective research techniques within the quantitative paradigm. Prerequisite: Admission to the doctoral program and completion of a multivariate statistics course. S.

NURS 575. Qualitative Nursing Research. 3 Credits.
This course focuses on examination and analysis of qualitative research designs with particular emphasis on approaches relevant to phenomena in nursing. Students will conduct fieldwork to develop some beginning qualitative research skills. Prerequisite or Corequisite: Admission to Doctoral Program or consent of instructor. F.

NURS 576. Clinical Anesthesia Practicum V. 5 Credits.
This is the final capstone clinical practicum course that provides the student with the opportunity to develop full autonomy and proficiency in nurse anesthesia practice. The emphasis of this course is the integration of current evidence and advanced nursing knowledge with advanced clinical judgement, well developed clinical decision making, and total case management for diverse patient populations receiving anesthesia care. Professionalism and leadership within healthcare systems will be emphasized. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S/U grading. SS.

NURS 577. Rural Healthcare Ethics. 3 Credits.
This course is directed toward the development of critical dialogue and leadership strategies for dealing with ethical issues related to nursing, health care and research. Commitment to discussion, understanding and acceptance of the rights of others in dilemmas is emphasized. Reflexive nursing, which brings attention to one's own position and objectivity, is encouraged. The challenges of ethics in rural milieus are included in the discourse. Prerequisite: Admission to the Nursing doctoral Program or consent of the instructor. S.

NURS 578. Doctoral Seminar. 1 Credit.
Prerequisite: Admission to the Nursing doctoral Program or consent of the instructor.

NURS 580. Research Practicum. 1-6 Credits.
The doctoral research practicum provides a research experience for doctoral nursing students separate from the dissertation to participate in the research process under the guidance of an experienced/funded investigator. Experiences may include grant writing, data collection, analysis, and manuscript writing. Repeatable to 6 credits. F,S,SS.

NURS 581. The Nurse Scientist. 3 Credits.
This course prepares the doctoral student to actively engage in doctoral study with knowledge of the discipline of nursing and skills that facilitate success as an emerging nurse scientist. Prerequisite: Admission to PhD program. F.
NURS 583. Individual Therapy. 2 Credits.
This course provides knowledge and skill development in the implementation of evidence-based clinical therapies and treatments focused on the individual including cultural variations. Includes clinical practice. Prerequisites or corequisites: NURS 500, NURS 502, NURS 510, NURS 511, NURS 514, NURS 523, NURS 535, NURS 538, NURS 539, and NURS 585.

NURS 584. Group and Family Therapies. 3 Credits.
Evidence-based clinical interventions with diverse groups and families are presented. Opportunities for clinical implementation accompany the theoretical models. A clinical/ laboratory component is included. Prerequisites or corequisites: NURS 538, NURS 583 and admission into Psychiatric Mental Health specialization or consent of instructor.

NURS 585. Advanced Health Assessment. 3 Credits.
An evidenced-based approach will be used to present methodologies for graduate student performance on health histories, developmental assessments, and physical/psychosocial assessments of individuals. Communication and interviewing techniques for advanced nursing practice are applied. A clinical/ laboratory component is included with variations for Family Nurse Practitioner, Psych/Mental Health, Adult-Gerontology, and Nurse Anesthesia students. An on-campus intensive is required for this course. Prerequisite: Completion of an undergraduate course in health assessment techniques or consent of instructor. Prerequisite or corequisite: NURS 510. F.S.

NURS 586. Rural Health Programs and Research. 3 Credits.
This course focuses on policies, programs and research related to rural health. Prerequisite: NURS 565 and NURS 558 or consent of instructor. F.

NURS 588. Management of Psychopathology I. 2 Credits.
This is the first of a two course sequence that focuses on the management of individuals across the lifespan, groups and families with or affected by psychopathology. Continuity of care across settings and community are emphasized. Prerequisites or Corequisites: NURS 564, NURS 584, and admission to the PMHNP program.

NURS 589. Management of Psychopathology II. 2 Credits.
This is the second of a two course sequence that focuses on the management of individuals across the lifespan, groups and families with or affected by psychopathology. Management of co-morbidities is emphasized. Prerequisite or Corequisite: NURS 588. S.

NURS 590. Directed Studies. 1-3 Credits.
Designed to meet the needs of individual and/or small groups of graduate students. The course content will be based on student interests and needs in conjunction with the faculty member's area of specialization. Prerequisite: Consent of instructor. Repeatable.

NURS 591. Readings in Nursing. 1-3 Credits.
Readings in selected nursing/health care topics with written and/or oral reports. Prerequisite: Consent of instructor. Repeatable.

NURS 592. Advanced PHN Practicum III. 4 Credits.
This course provides a capstone experience in Advanced PHN practice. Students are expected to integrate knowledge from all of their previous coursework into an applied practicum experience in population health, to evaluate population health interventions and programs, and develop strategies for program funding. Prerequisites: NURS 548 and NURS 549.

NURS 593. DNP Internship I. 1-4 Credits.
This first DNA Internship course is designed to provide the DNA Advanced Practice Nurse (APN) student with opportunities to apply the concepts in the AACN DNA Essentials document in the practice environment. Students will also begin development of the DNA capstone project. Corequisite: NURS 598.

NURS 594. DNP Internship II. 4 Credits.
This course is designed to provide the DNP student with additional practice focused learning opportunities to apply the concepts in the AACN DNP Essentials document in the practice environment. The student will complete and disseminate findings from the capstone project. Prerequisite: NURS 593. Corequisite: NURS 599.

NURS 595. DNP Internship III. 4 Credits.
This course is designed to provide the DNP APN with additional practice focused learning opportunities to apply the concepts in the AACN DNP Essentials document in the practice environment. The student will complete the DNP capstone project and disseminate findings in presentations and publications. Prerequisites: NURS 593 and NURS 594. Corequisite: NURS 596.

NURS 597. Advanced Clinical Practicum. 1-12 Credits.
This clinical practicum course provides the student with the opportunity to obtain extended clinical experience in the area of specialization. The course focuses on the integration of theoretical knowledge into clinical practice. A clinical/laboratory component is included. Prerequisite: Completion of NURS 517 for Nurse Anesthesia specialization or completion of first year curriculum for the Family Nurse Practitioner, Psychiatric/Mental Health or Gerontology specializations. Repeatable. S/U grading.

NURS 600. Integrated DNP Core Concepts I. 3 Credits.
This course is an exploration of the core concepts that support the varying roles of the DNP prepared APRN as a practice focused leader and clinical scholar. Development of practice focused leadership skills in the care of rural and vulnerable populations will also be addressed. Prerequisite: Admission to the DNP Program. F.

NURS 601. Integrated DNP Core Concepts II. 3 Credits.
This course builds upon content covered in Integrated DNP Core Concepts I. Students continue to explore core concepts that support the varying roles of the role of the DNP prepared APRN practice focused leader and clinical scholar. In addition, students will critically examine the historical evolution of epidemiology and epidemiological concepts relevant in advanced nursing practice. Prerequisites: Admission to the DNP Program and NURS 600. S.

NURS 602. Evidence Based Research I. 3 Credits.
This course focuses on the development of practice scholarship through the use of evidence to address clinical problems and inform future practice. Students in the class will define practice problems, evaluate evidence based methods to address those problems and design practice focused projects to measure outcomes. Middle range theories will also be explored and used as frameworks for study designs. Statistics and previous Evidence Based Practice course is highly recommended. Prerequisite or Corequisite: Admission to the DNP program. F.

NURS 603. Evidence-Based Research II. 3 Credits.
This course focuses on the continued development of the practice scholar and includes content of research and program evaluation methods and analysis used to address practice problems and inform future evidence based practice. Prerequisite: NURS 602. Corequisite: NURS 609. S.

NURS 604. Health Informatics. 3 Credits.
This course prepares the health care professional to use and evaluate emerging health care technology and data systems to support evidence-based practice. Prerequisite: Admission to DNP Program or consent of instructor. SS.

NURS 605. Health Policy. 2 Credits.
This course will prepare the health care professional to understand and apply knowledge of health policy to function as an advocate for populations and individuals. Prerequisite: Admission to the DNP Program or consent of instructor. SS.

NURS 606. DNP Systems Focused Practice I. 2 Credits.
This course is designed to provide the DNP student with opportunities to apply the concepts in the AACN DNP Essentials in the practice environment. Prerequisite: NURS 603. SS.

NURS 607. DNP Systems Focused Practice II. 3 Credits.
This course continues to provide the DNP student with opportunities to apply the concepts in the AACN DNP Essentials in the practice environment. Prerequisites: NURS 603 and NURS 606. F.

NURS 608. Healthcare Economics, Finance and Leadership. 3 Credits.
This course focuses on healthcare economics, finance and practice leadership skills through the role of the DNP prepared advanced practice nurse within the complex health care system. Prerequisite or Corequisite: Admission to the DNP program or consent of instructor. F.

NURS 609. DNP Project Teams. 1-6 Credits.
The student will design, implement and evaluate the DNP project as well as present findings in the applicable practice setting under the guidance of DNP faculty. Prerequisite: NURS 603. Repeatable to 6 credits. F,S,SS.

NURS 610. DNP Capstone. 2 Credits.
The capstone course provides the DNP students with an opportunity to develop skills in reporting and disseminating practice focused research findings. Writing for publication of practice focused research is emphasized. Prerequisite or Corequisite: NURS 608. SS.

NURS 611. Rural Healthcare Forum. 1 Credit.
This course focuses on interprofessional healthcare delivery to rural and underserved populations. Prerequisite or Corequisite: Admission to DNP program or consent of instructor. SS.
NURS 997. Independent Study. 2 Credits.
NURS 998. Thesis. 1-4 Credits. Repeatable to 4 credits.
NURS 999. Dissertation. 1-15 Credits. Repeatable to 15 credits.

Master of Science in Nurse Anesthesia

The UND Nurse Anesthesia program has transitioned to a Doctor of Nursing Practice (DNP) degree program; therefore, the Master of Science in Nurse Anesthesia has been suspended and no new applications are being accepted at this time.

Admission Requirements

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog. Admission requirements for the Master of Science in Nursing include:

1. A bachelor’s degree in nursing from an NLNAC or CCNE accredited program. (Foreign schools will be evaluated on an individual basis.)
2. A minimum GPA of 3.00 is based on all years of study at the undergraduate level and includes a GPA of 3.00 in undergraduate science coursework.
3. An undergraduate or graduate course in statistics.
4. Current R.N. licensure (Photocopy must be attached to application.).
5. One year of experience as a registered nurse (preferred).
6. Additional requirements for Nurse Anesthesia are an upper division course in biochemistry (corequivalent), an undergraduate college algebra course (equivalent or higher), one year of critical care nursing experience (two years are preferred), and a successful interview.
7. Meet current health and immunization requirements of the College of Nursing and Professional Disciplines.
8. Submit to and satisfactorily complete a background check prior to admission.
9. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.
10. Applications must be received by September 1 of the calendar year.

Degree Requirements

Students seeking the Master of Science in Nursing degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the College of Nursing.

There is no residency requirement.

1. A minimum of 30 semester credits in a major field, including the credits granted for the thesis and the research leading to the thesis.
2. At least one-half of the credits must be at or above the 500-level.
3. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.
4. Completion of the for the M.S. thesis option or completion of for the M.S. non-thesis option.
5. Clinical site visits by nursing professors are required by various certifying and accrediting bodies to appropriately supervise the learning experience of students. A clinical site visit course fee is required to offset the expenses to travel, arrange, and supervise clinical experiences across the state and beyond. Prospective students will be made aware of the Clinical Site Visit Course Fee structure through posting of the fees structure on the College of Nursing and Professional Disciplines website and in the College’s Graduate Handbook.
6. Required Courses:

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<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
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<tbody>
<tr>
<td>NURS 500</td>
<td>Theories/Concepts Nursing</td>
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<td>NURS 502</td>
<td>Evidence for Practice</td>
<td>3</td>
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<td>NURS 504</td>
<td>Advanced Pharmacology I</td>
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<td>NURS 506</td>
<td>Advanced Pharmacology II</td>
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<td>NURS 507</td>
<td>Anesthesia Seminar and Clinical Practicum</td>
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<td>NURS 508</td>
<td>Nurse Anesthesia Review Course</td>
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<td>NURS 510</td>
<td>Adv Physiology/Pathophysiology I</td>
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<td>NURS 511</td>
<td>Adv Physiology/Pathophys II</td>
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<td>Anesthesia Seminar and Clinical Practicum II</td>
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<td>NURS 520</td>
<td>Prof Role Dvlpmnt/Nurse Ansthsia</td>
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<tr>
<td>NURS 521</td>
<td>Foundations of Anesthesia Practice</td>
<td>3</td>
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<td>NURS 527</td>
<td>Anesthesia Seminar and Clinical Practicum III</td>
<td>5</td>
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<td>NURS 585</td>
<td>Advanced Health Assessment</td>
<td>3</td>
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<td>NURS 597</td>
<td>Advanced Clinical Practicum</td>
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<td>ANAT 591</td>
<td>Special Topics in Anatomy and Cell Biology</td>
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<tr>
<td>BIMD 510</td>
<td>Basic Biomedical Statistics</td>
<td>2</td>
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<tr>
<td>NURS 997</td>
<td>Independent Study</td>
<td>2-4</td>
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</table>
Total Credits: 76

Students complete 29 credits of NURS 597 Advanced Clinical Practicum to comply with accreditation standards for supervised practice hours in anesthesia nursing. Total credits: 78-80.

Nurse Educator

M.S. in Nurse Educator (p. 491)

Master of Science in Nurse Educator

Admission Requirements

Approved admission to the Master of Science degree program requires the following of all students:

1. Completion of a baccalaureate degree or higher from an accredited nursing program
2. An undergraduate or graduate statistics course
3. A minimum GPA of at least 3.00 for the last two years of baccalaureate study (official transcripts must be submitted)
4. Current U.S. unencumbered RN licensure (upload Nursys verification report in application)
5. Three letters of recommendation
6. Current resume or curriculum vitae
7. Statement of goals
8. One year of experience as a registered nurse preferred – track specific experience desirable
9. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.
10. Interview may be required (via web, phone, or in person)
11. Successful passage of criminal background check and drug screen will be required upon offer of admission.
12. Satisfaction of current health and immunization policy of the Department of Nursing will be required upon offer of admission.

Degree Requirements

Students seeking the Master of Science in Nursing degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the College of Nursing & Professional Disciplines.

1. A minimum of 30 semester credits in a major field.
2. At least one-half of the credits must be at or above the 500-level.
3. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.

Required Courses:

Nurse Educator

- **NURS 500** Theories/Concepts Nursing 3
- **NURS 502** Evidence for Practice 3
- **NURS 505** Advanced Pharmacology 3
- **NURS 509** Foundations for Nurse Education 3
- **NURS 522** Advanced Pathophysiology 3
- **NURS 523** Health Promotion 3
- **NURS 536** Advanced Nurse Educator Practice of Health Promotion 2
- **NURS 566** Curriculum Development 3
- **NURS 567** Teaching Methodologies 3
- **NURS 568** Teaching Practicum 2
- **NURS 569** Assessment and Evaluation 3
- **NURS 585** Advanced Health Assessment 3
- **NURS 605** Health Policy 2
- **NURS 997** Independent Study 2

Total Credits 38

Psychiatric Mental Health Nurse Practitioner

M.S. in Psychiatric Mental Health Nurse Practitioner (p. 497)


Courses

- **NURS 500. Theories/Concepts Nursing. 3 Credits.**
  - The focus of this core course is on analysis of current nursing and related theories and concepts which guide clinical practice, curriculum development, research, and nursing administration.

- **NURS 502. Evidence for Practice. 3 Credits.**
  - This course emphasizes the application of basic research concepts to the building of evidence-based practice in nursing. Advanced competencies are developed in searching and evaluating the literature, examining the merit of different types and levels of evidence, and analyzing the generalizability and implications for clinical practice. Prerequisites or Corequisites: Admission to one of the Graduate Nursing Tracks, NURS 500 and statistics and/or permission of instructor. F.S.

- **NURS 503. The Business of Practice. 2 Credits.**
  - This course focuses on the business aspects of inter-professional advanced practice in the complex health care environment. Prerequisite: Admission to the DNP Program.

- **NURS 504. Advanced Pharmacology I. 3 Credits.**
  - Pharmacodynamic and pharmacokinetic principles with a focus on clinical anesthesia practice. Physiologic systems and drug classifications are used; emphasis on therapeutic use, side effects, drug interactions, and contraindications of drugs used for intravenous anesthesia induction, inhalation, and balanced anesthesia maintenance. Pediatric and geriatric variations will be addressed. Prerequisite: Admission to Nurse Anesthesia Specialization.

- **NURS 505. Advanced Pharmacology. 3 Credits.**
  - The focus of this course is on the basic and advanced clinical concepts of pharmacology for the advanced practice nurse. Medication selection and administration will be addressed. Anatomy, physiology, and pathophysiology will be reviewed as appropriate to the physiologic system or medication class being discussed. Evidence-based guidelines with respect to the clinical application of medications utilized in selected acute and chronic health problems will be explored. Prerequisite or Corequisite: Admission to Graduate Nursing Program. F.

- **NURS 506. Advanced Pharmacology II. 3 Credits.**
  - Advanced pharmacology for clinical nurse anesthesia practice. Prerequisite: NURS 504.

- **NURS 507. Anesthesia Seminar and Clinical Practicum. 4 Credits.**
  - This course is designed to provide nurse anesthesia students an overview of the basic principles and skills needed to care for the routine surgical patient. Topics include difficult airway management, patient monitoring, patient preparation, positioning, patient safety, fluid and electrolyte management, documentation of anesthesia care, and an introduction to regional anesthesia. Analysis, integration, and utilization of research to improve practice is emphasized. The lecture content is reinforced through Clinical Simulation and laboratory experiences, allowing for immediate application of the lecture content and integration into the clinical setting. Students are introduced to the clinical setting through observational and hands-on experiences. Includes a clinical and/or laboratory component. Prerequisite: NURS 521.

- **NURS 508. Nurse Anesthesia Review Course. 1 Credit.**
  - This course is faculty guided and designed to assist students with their review of nurse anesthesia course and clinical material in preparation for the CCNA certification examination. Prerequisite: Completion of all Nurse Anesthesia Specialization coursework.

- **NURS 509. Foundations for Nurse Education. 3 Credits.**
  - This course begins to compare and contrast multiple roles and responsibilities of nurse educators in various settings in academic and health service. It will build the conceptual foundation for educational processes with emphasis on ethics, learning theories, taxonomies of learning and current evidence necessary for development of competencies necessary for the practice of educating. Students will begin to formulate their individual philosophy of teaching and learning. Prerequisite: Admission to the Nursing Graduate Program or consent of the instructor. Prerequisite or Corequisite: NURS 500. S.

- **NURS 510. Adv Physiology/Pathophysiology I. 3 Credits.**
  - Normal physiologic functions associated with cellular structure and environment. Physiologic and pathophysiologic functions of the human body and its organ systems, both separately and integrated in whole activities. Prerequisite: Admissions to graduate study.

- **NURS 511. Adv Physiology/Pathphys II. 3 Credits.**
  - Physiologic and pathophysiologic functions of the human body and its organ systems, both separately and integrated in whole activities. Prerequisite: NURS 510 or consent of instructor.

- **NURS 512. DNP Core Concepts I. 2 Credits.**
  - This course is an exploration of the core concepts that support the developing role of the DNP as a practice focused leader and researcher. Prerequisite: Admission to the DNP Program.

- **NURS 513. DNP Core Concepts II. 2 Credits.**
  - This course focuses on the concepts that support the development of the role of the DNP practice leader in the care of rural and vulnerable populations and issues related to planning and providing care for vulnerable and underserved populations. The primary content focus areas are epidemiology and vulnerability related to population and individual health. Prerequisites: Admission to the DNP Program and NURS 512. S.
NURS 514. Essentials in Epidemiology. 3 Credits.
This course will emphasize the application of the principles of epidemiology as applied to the investigation and prevention of individual and population health problems. Students will evaluate care delivery models and analyze epidemiological data to develop and apply strategies for health promotion and disease prevention for individuals, aggregates, and populations. The core competencies will focus not only on the practice of public health, but also enhance practice for the clinician. Prerequisite: Admission to the Graduate School, MPH Program, or permission of the instructor. F.S.

NURS 515. Basic Principles of Anesthesia Practice I. 3 Credits.
This course provides an introduction to the fundamental principles necessary for the safe, professional, and individualized anesthetic care of diverse patients. Foundational concepts such as chemistry and physics as they apply to anesthesia practice, pharmacology of anesthetic agents, uncomplicated airway management, anesthesia delivery systems, and physiological monitoring will be investigated. Low and high fidelity patient simulation will be utilized to develop the student's cognitive and psychomotor skills which are essential to clinical anesthesia management. The course will conclude with a clinical component designed to acclimate beginning nurse anesthetists to the clinical anesthesia arena. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. F.

NURS 516. Basic Principles of Anesthesia Practice II. 3 Credits.
This course builds upon the fundamentals covered in Basic Principles of Anesthesia I, all of which are necessary for the safe, professional, and individualized anesthetic care of diverse patients. Concepts such as basic perioperative anesthetic management, pain management, regional anesthesia, difficult airway management, effective oral and written communication, and patient and healthcare provider safety are emphasized. Low and high fidelity patient simulation will be utilized to develop the student's cognitive and psychomotor skills which are essential to clinical anesthesia management. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S.

NURS 517. Anesthesia Seminar and Clinical Practicum II. 5 Credits.
This course builds upon the foundations learned in the prerequisite course. Advanced anesthesia principles are applied to various patient populations, including the surgical patient with cardiovascular and respiratory diseases. Anesthesia care of other surgical populations including the trauma, orthopedic, urological, vascular, intra-abdominal and ENT patient will be explored. Important concepts include anatomical, physiological and pathophysiological, and pharmacological principles. Analysis, integration, and utilization of research to improve practice is emphasized. The lecture content is reinforced through simulated laboratory experiences, allowing for immediate application of the lecture content and integration into the clinical setting. A clinical rotation is included. Prerequisite: NURS 507.

NURS 518. Pharmacotherapeutics for Nurse Anesthesia. 2 Credits.
The focus of this course is on advanced clinical concepts of pharmacology relevant to the nurse anesthetist during the peripерioperative period. This course utilizes concepts from NURS 505 Advanced Pharmacology and further advances the student's knowledge in pharmacological concepts related to the practice of anesthesia. The course will examine the clinical application of anesthesia specific pharmacologic principles into formulating anesthetic plans for diverse patient populations. Prerequisite or Corequisite: NURS 505; Admission to the DNP Program - Nurse Anesthesia Track. S.

NURS 519. Practice Leadership. 2 Credits.
This course focuses on practice leadership theories and strategies related to the role of the DNP advanced practice nurse within the complex health care system. Prerequisite: Admission to DNP Program or consent of instructor. NURS 520. Prof Role Dvlpmnt/Nurse Anesthesia. 3 Credits.
The focus of this course is on the identification and analysis of the professional components of nurse anesthesia practice, emphasizing role development, management and leadership; medical, ethical and legal responsibilities; the provision of culturally competent care; and scope of professional practice. Other areas that will be explored include quality improvement, the legislative process, credentialing, professional organizations, conflict resolution, and self-care and stress management for the anesthetist. An in-depth analysis of current trends and issues affecting healthcare and the delivery of anesthesia services are included in the course content. Prerequisites: NURS 521 and NURS 507. Corequisite: NURS 517.

NURS 521. Foundations of Anesthesia Practice. 3 Credits.
This course provides the foundation for nurse anesthesia practice. Lecture and discussion begin with an analysis of the history of anesthesia nursing, professionalism, and standards of care for the anesthetist. Safety in the nurse anesthesia environment will be emphasized. Additional content includes the applied chemical, physical, and biochemical concepts as they relate to anesthesia practice, including the mechanisms of anesthesia, medical mathematics, medical gas systems, laws governing gases, the anesthesia machine, monitoring principles and equipment, airway equipment and basic airway management, and universal precautions. Prerequisite: Admission to the Nurse Anesthesia Specialization.

NURS 522. Advanced Pathophysiology. 3 Credits.
This course presents a system-focused approach to alterations in normal physiological mechanisms that result in pathologic disease processes. Physiological changes are compared and contrasted over the lifespan and developmental cellular physiology, pathogenesis and clinical manifestations commonly observed in altered health states are reviewed. This knowledge serves as the foundation for advanced clinical assessment, decision making and management for the advanced practice nurse. Prerequisite: Admission to graduate study. F.S.SS.

NURS 523. Health Promotion. 3 Credits.
Paradigms in health promotion, health detection, and disease prevention across the lifespan are used in synthesis in theory and evidence-based primary care interventions. Prerequisite: Admission to the Nursing Graduate Program or consent of the instructor. F.S.

NURS 524. Anatomy for Nurse Anesthetists. 1 Credit.
This course builds upon the concepts and fundamentals of Basic Principles of Anesthesia I and II as it relates to the detailed regional anatomy of the human body. A cadaver laboratory experience will be utilized throughout the course to develop the student's understanding of clinical anatomy related to the airway, central nervous system, peripheral nerves, cardiovascular system, and pulmonary system with an anesthesiology context. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S.

NURS 525. Applied Multivariate Statistics. 3 Credits.
Principles, assumptions and applications of major multivariate statistical techniques commonly used in nursing and clinical health research. Prerequisite: Graduate level univariate statistics and admission to the Nursing Doctoral Program or consent of the instructor. F.

NURS 526. Ethical, Legal and Health Policy Issues. 3 Credits.
This course emphasizes health policy issues within the context of legal and ethical concepts. Students will examine and debate health policies in current practice, thus broadening their ability to analyze, implement, and evaluate health policy issues.

NURS 527. Anesthesia Seminar and Clinical Practicum III. 5 Credits.
This course further builds on the foundations learned in prerequisite courses. Students will incorporate previously learned anatomy, physiology, pathophysiology, and patient management into the care of subspecialty patients and patients with complex co-existing diseases. Advanced anesthesia principles are applied to the OB, pediatric, geriatric, and neuro patient. The pharmacology and anesthesia management of these subspecialty populations and patients with various disease states, such as kidney, musculoskeletal, and endocrine disorders, will be explored. Analysis, integration, and utilization of research to improve clinical practice is emphasized. The lecture content is reinforced with a clinical experience that emphasizes anesthesia care for subspecialty populations. A clinical/laboratory component is included. Prerequisite: NURS 517.

NURS 528. Advanced Principles of Anesthesia Practice I. 4 Credits.
This course builds upon the nurse anesthesia foundations covered previously in the Basic Principles of Anesthesia I and II courses. An evidence based approach to the anesthetic evaluation, planning, and management of diverse and increasingly complex patient populations, such as those with pre-existing respiratory, cardiac, and renal diseases, will be the focus. The hands-on administration of safe, individualized, and comprehensive anesthetic plans of care to both simulated and actual patients will be introduced and emphasized. Low and high fidelity patient simulation will be utilized to continue developing the student's cognitive and psychomotor skills which are essential to perform clinical anesthesia management. A clinical component will allow the student to apply theoretical principles to nurse anesthesia practice and to increase their clinical skills, knowledge, and autonomy. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. SS.
NURS 529. Advanced Principles of Anesthesia Practice II. 6 Credits.
This course builds on the foundations covered in Basic Principles of Anesthesia I and II along with Advanced Principles I including the evaluation, planning, and management of diverse and increasingly complex patient populations. Evidence-based advanced principles of anesthesia care will be investigated in order to construct and implement comprehensive and individualized anesthetic plans of care for the management of subspecialty patients. Obstetrical and pediatric populations, as well as patients with complex co-existing diseases and/or those undergoing complex surgical procedures will be the focus. Low and high fidelity patient simulation will be utilized to continue developing the student's cognitive and psychomotor skills which are essential to perform clinical anesthesia management. A clinical component will allow the student to apply theoretical principles to nurse anesthesia practice and to increase their clinical skills, knowledge, and autonomy. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. F.

NURS 530. Research Design & Methods in Nursing. 3 Credits.
Prerequisite or corequisite: NURS 500 or consent of instructor.

NURS 531. Adult-Gerontology Illness Management I. 3 Credits.
This is the first of a two-course sequence that focuses on evidenced-based primary care diagnosis and management of common episodic/chronic problems encountered by young adults, adults and older adults and their social network in ambulatory, inpatient, and community settings. Physiological, psychosocial, and pharmacological interventions are integrated into the holistic care that incorporates age-related, cultural, family, and community variations. An on-campus intensive is required for this course. Prerequisites: NURS 511 and NURS 585. Corequisite: NURS 597. F.

NURS 532. Family Centered Advanced Practice Nursing. 3 Credits.
Theoretical and scientific foundations for advanced practice nursing care for the family-as-a-unit in health and illness across the lifespan. Prerequisite: Admission to DNP program or consent of instructor. S.

NURS 533. Adult-Gerontology Illness Management II. 3 Credits.
This is the second of a two-course sequence that focuses on evidenced-based primary care diagnosis and management of common episodic/chronic problems encountered by young adults, adults and older adults and their social network in ambulatory, inpatient, and community settings. Physiological, psychosocial, and pharmacological interventions are integrated into the holistic care that incorporates age-related, cultural, family, and community variations. An on-campus intensive is required for this course. Prerequisite: NURS 531. Corequisite: NURS 597. S.

NURS 534. Management of Health Conditions in Primary Care I. 3 Credits.
This is the first of a two-course sequence that focuses on evidenced-based primary care diagnosis and management of common episodic/chronic problems encountered by adults, including young adults, middle aged adults and older adults and their social network in ambulatory, inpatient, and community settings. Physiological, psychosocial, and pharmacological interventions are integrated into the holistic care that incorporates age-related, cultural, family, and community variations. Prerequisites: NURS 522 and NURS 585. Corequisite: NURS 597 (II). F, S, SS.

NURS 535. Advanced Pharmacology for Primary Care I. 2 Credits.
Pharmacological agents utilized to treat common acute and chronic health problems are explored in depth. The course focus is on advanced nurse practice roles related to prescription, pharmacological, and therapeutic applications of the drugs. Prerequisite: Admission to the Nursing Graduate Program or consent of the instructor. Prerequisite or corequisite: NURS 510. F, S.

NURS 536. Advanced Nurse Educator Practice of Health Promotion. 2 Credits.
This practicum course affords the Nurse Educator student with opportunities to develop advanced skills in teaching-learning practices in the rural health care environments. The student will apply educational theories and best-evidence teaching strategies with a particular emphasis in education related to health promotion strategies. This course will include topics such as the Nurse Educator role to promote health in rural communities, assess health literacy, and develop appropriate patient educational materials. The practicum emphasizes health promotion education to meet diverse needs of rural dwelling patients, families and groups. Prerequisites: NURS 500, NURS 511, NURS 539, and NURS 514. Corequisite: NURS 526, and NURS 569. F.

NURS 537. Graduate Cooperative Education. 1-2 Credits.
The course focus is upon experience in advanced nursing practice integrating theory, research, and advanced practice in a specific area of nursing. Course overview: the purpose of this course is to provide the graduate nursing student with advanced nursing practice as an employee in a health care agency and to evaluate that experience in relation to the educational program. A clinical/laboratory component is included. Prerequisite: Permission of Graduate Director of Nursing. Repeatable to 9 credits.

NURS 538. Psych Diagnostic Reasoning. 2 Credits.
This course prepares students for advanced therapeutic communication, interview strategy, and assessment of people with mental illness across the life span. Skills are developed in differential diagnoses of psychopathology with the scope and standards of advanced psychiatric mental health nursing practice. Clinical application is included. Prerequisite: Acceptance into the PMHNP program or permission of instructor. S.

NURS 539. Advanced Pharmacology for Primary Care II. 2 Credits.
Pharmacological agents utilized to treat common acute and chronic health problems are explored in depth. The course focus is on advanced nurse practice roles related to prescription, pharmacological, and therapeutic applications of the drugs. Prerequisite: Admission to nursing graduate program and NURS 535 or consent of instructor. F, S.

NURS 540. Management of Health Conditions in Primary Care II. 3 Credits.
Clinical decision making skills are developed in the diagnosis and management of acute and chronic health conditions throughout the lifespan. Health promotion, health protection, and disease prevention are emphasized. Prerequisite: NURS 534. F, S, SS.

NURS 541. Illness Management - Adult Gerontology I. 3 Credits.
This is the first of a two-course sequence focusing on evidence-based primary care specific to the adult-gerontology population which includes adolescents, young adults and frail, older adults. This course prepares students to provide healthcare services across the adult-gerontology age spectrum from wellness to illness, using scientific knowledge and theoretical foundations to differentiate between normal and abnormal changes in physiological, psychological and sociological development and aging. Students will develop strategies to provide and coordinate interdisciplinary and holistic care that incorporates age-related, cultural, family, and community variations. Prerequisites: NURS 522, NURS 585, and NURS 597 (I). Corequisite: NURS 597 (II). F, S, SS.

NURS 542. Professional Aspects of Nurse Anesthesia Practice. 3 Credits.
This course provides the entry-level nurse anesthesia student with a foundational knowledge of professional aspects related to nurse anesthesia practice. The focus of this course is on historical perspectives, professional role development, anesthesia business practices, and professional wellness. Prerequisite: Admission to the DNP Program - Nurse Anesthesia Track. F.

NURS 543. Illness Management - Adult Gerontology II. 3 Credits.
This is the second of a two-course sequence that focuses on evidence based primary care specific to the adult-gerontology population which includes adolescents and young adults to frail, older adults. Course work focuses on evidence based acute and chronic care diagnosis and management of common episodic acute and chronic problems encountered by the adult-gerontology population. Physiological, psychosocial, and pharmacological assessments, including changes associated with aging and development across the adolescent - adult continuum are integrated into the formation of differential diagnosis and interventions of clinical problems in collaboration with other care providers. Prerequisites: NURS 541 and NURS 597 (II). Corequisite: NURS 597 (III). F, S, SS.

NURS 544. Pharmacotherapeutics for Primary Care. 2 Credits.
This course will help prepare the advance practice nursing student for prescriptive authority. Topics will focus on decision making regarding the pharmacological management of common acute and chronic illnesses encountered in primary care settings. Pharmacokinetics, pharmacodynamics, adverse drug reactions, and contraindications will be discussed. Ethical and legal principles of writing prescriptions will also be covered. Students will synthesize research findings related to various medications using case study and discussion. Prerequisites: Admission to DNP program (FNP, AGNP tracks), and NURS 505. S.

NURS 545. Care of the Frail Older Adult. 3 Credits.
In this course the advanced practice nursing student will focus on the complex and multifactorial health care needs of frail elders. Students will develop strategies to provide and coordinate interdisciplinary and holistic care to the frail elderly in a variety of settings. Prerequisite: Admission to DNP program or consent of instructor. S.
NURS 546. Advanced PHN I. 4 Credits.
NURS 546 introduces concepts foundational to advanced PHN practice and population health. Corequisite: NURS 547.

NURS 547. Advanced PHN Practicum I. 4 Credits.
The focus of this course is on application of foundational concepts of Advanced PHN practice. Students will conduct a community assessment and identify community problems and strengths. Written and oral communication skills are emphasized. Corequisite: NURS 546.

NURS 548. Advanced PHN II. 3 Credits.
This course focuses on the leadership role of advanced PHN practice. Public health and community-based organizational assessment, program monitoring and evaluation, quality improvement, and management of multiple projects are emphasized. Concepts of leadership in public and community health and collaborative interdisciplinary practice are discussed. Health policy and law and ethics as they relate to public health are explored. In addition, advanced PHN leadership in rural areas and in disaster/emergency preparedness and management are discussed. Prerequisites: NURS 502, NURS 546, and NURS 547. Corequisite: NURS 549.

NURS 549. Advanced PHN Practicum II. 3 Credits.
This course focuses on implementation of advanced PHN interventions. Corequisite: NURS 548.

NURS 550. Global Public Health Issues. 2 Credits.
This course focuses on population health issues at a global level. Differences in population health status between developing and developed countries are explored. Special emphasis is placed on war as a public health issue and the global impact of AIDS.

NURS 552. Role Development of the CNS. 2 Credits.
Students will compare and contrast the various roles of the clinical nurse specialist and evaluate those roles as they relate to their individual area of practice. Concepts of professional development are emphasized. Prerequisite: NURS 502.

NURS 553. Role Development of the NP. 2 Credits.
This course emphasizes professional role development of the nurse practitioner. Students will compare and contrast the various roles of the nurse practitioner and evaluate those roles as they relate to the student's individual planned area of practice. Prerequisite: NURS 502.

NURS 554. Writing for Publication. 2 Credits.
The course is designed to provide students with knowledge and skills necessary to meet the PhD program requirement and milestone of preparing and submitting a manuscript for publication in a peer-reviewed journal. The achievement of this milestone is foundational for scientific inquiry and the development of nurse scientists. Prerequisite: Consent of Instructor or Advisor. S/U grading. F,SS.

NURS 555. Grant Submission. 2 Credits.
The course results in the development and submission of a pre-doctoral, federally-funded research grant proposal, or equivalent with advisor approval. The course builds upon previous doctoral coursework covering grantsmanship and issues in preparing funded research proposals and grant budgets. Prerequisites: NURS 573 and consent of Instructor or Advisor. F,SS.

NURS 556. PhD Student Intensive. 1 Credit.
This course submerges the student into a community of scholars during an annual on-campus intensive experience. The student will participate in a variety of presentations, workshops, and activities which focus on development into the role of a nurse scientist and scholar. The course uses a variety of activities which help the student develop into the role of a nurse scientist and scholar. Prerequisite: Admission to the Nursing PhD program. Repeatable to 5 credits. S/U grading. F,S.

NURS 557. Foundations of Nursing Science. 3 Credits.
The epistemology and philosophy of nursing as an art and a science are examined. Patterns of knowing as well as clinical, conceptual, and empirical types of nursing knowledge will be discussed. The development of theory as a knowledge claim is analyzed. Prerequisites: Masters Level Nursing Theory Course and Admission to PhD Program. S.

NURS 558. Research Design. 3 Credits.
This course prepares the doctoral student to understand the link between research design and study purpose. Prerequisite: Admission to PhD program or consent of instructor. F.

NURS 559. Maternal and Child Health in Primary Care. 2 Credits.
This course focuses on advanced practice nursing care of obstetric and pediatric clients within a primary care setting. An on-campus intensive is required for this course. Prerequisites: Admission to FNP, NURS 510, NURS 511, NURS 523, and NURS 585. SS.

NURS 560. Clinical Anesthesia Practicum I. 5 Credits.
This is the first of five clinical practicum courses that build upon one another and provides students the opportunity to obtain the clinical experiences necessary to develop increasing proficiency in nurse anesthesia practice. The emphasis of this course is the integration of current evidence and advanced nursing knowledge with decision making and case management for diverse, but less complex patient populations receiving anesthesia care. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S/U grading. S.

NURS 561. Clinical Anesthesia Practicum II. 3 Credits.
This is the second of five clinical practicum courses designed to provide the student with the opportunity to obtain clinical experiences necessary to develop increasing proficiency in nurse anesthesia practice. The emphasis of this course is the integration of current evidence and advanced nursing knowledge with decision making and case management for diverse and increasingly more complex patient populations receiving anesthesia care. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S/U grading. SS.

NURS 562. Clinical Anesthesia Practicum III. 4 Credits.
This is the third of five clinical practicum courses that provides the student with the opportunity to obtain clinical experiences necessary to develop increasing proficiency in nurse anesthesia practice. The emphasis of this course is the integration of current evidence and advanced nursing knowledge with decision making and case management for diverse, increasingly complex, patient populations receiving anesthesia care. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S/U grading. F.

NURS 563. Clinical Anesthesia Practicum IV. 6 Credits.
This is the fourth of five clinical practicum courses that provides the student with the opportunity to obtain clinical experiences necessary to develop increasing proficiency in nurse anesthesia practice. The emphasis of this course is the integration of current evidence and advanced nursing knowledge with decision making and case management for diverse, increasingly complex patient populations, of all acuity levels, receiving anesthesia care. Emphasis will also be placed on student autonomy, continuing professional role development, and leadership skills. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S/U grading. S.

NURS 564. Psychopharmacology. 2 Credits.
This course provides the advanced practice student with knowledge in the pharmacology of psychopathology across the life span. Emphasis will be placed on the appropriate use of pharmaceuticals for psychiatric disabilities/disorders including: Mood disorders, development disorders, psychosocial disorders, anxiety disorders, dementia, and substance abuse. Prerequisite: Admission to PMHNP program or permission of instructor. S.

NURS 565. Rural Populations and Rural Health. 3 Credits.
This course provides an overview of characteristics of rural populations and rural health. Factors that contribute to health, morbidity, and mortality are examined, and the compounded vulnerability of rurality and disadvantage groups is analyzed. Prerequisite: A graduate level Epidemiology course or permission of instructor. S.

NURS 566. Curriculum Development. 3 Credits.
This course focuses on the curriculum development process. Societal, professional, and institutional factors as well as current research findings influencing the curriculum development process are analyzed. Consideration of the impact of adult learning principles, workforce issues, legal-ethical concerns, and diverse student populations in regard to the curriculum development process is given. Prerequisite: NURS 509.

NURS 567. Teaching Methodologies. 3 Credits.
The course explores theory-based teaching strategies designed to develop cognitive abilities, psychomotor skills, and affective qualities in learners from diverse backgrounds. Strategies and methods for the teaching of nursing content in a variety of settings are utilized. The use of technological tools in nursing education is evaluated. Prerequisite or corequisite: NURS 566.
NURS 568. Teaching Practicum. 2 Credits.
Students assume the role of the nurse educator in selected learning settings under the guidance of a preceptor. A clinical/laboratory component is included. Prerequisites: NURS 566 and NURS 567 and NURS 569, or consent of instructor.

NURS 569. Assessment and Evaluation. 3 Credits.
Principles of assessment, measurement, and evaluation are analyzed in this course as they relate to nursing education. The processes of assessing student learning, teaching, and program outcomes are explored. Topics relevant to the evaluation of individual student learning such as test development, evaluation of critical thinking, and clinical evaluation are included. The processes of faculty and program evaluation are examined. Prerequisites: NURS 566 and NURS 567, or consent of instructor.

NURS 572. Diverse Vulnerable Populations. 3 Credits.
Students will explore a wide range of concepts as they apply to diverse and vulnerable populations. The focus of the course is on understanding concepts and principles important to nursing when doing research, planning health care, developing health policy, and teaching in this area. Prerequisite: Admission to the Nursing Graduate Program or consent of the instructor.

NURS 573. Research Funding. 3 Credits.
This course integrates the scientific and practical aspects of professional writing and grant proposal development to obtain funds for research. Prerequisite: Admission to the graduate nursing program or approval of instructor. Prerequisite or Corequisite: NURS 574 and/or NURS 575; Non-nursing programs: Graduate level quantitative and/or qualitative research methods coursework required. F.

NURS 574. Quantitative Nursing Methods. 3 Credits.
The purpose of this course is to acquire knowledge and skills necessary to apply quantitative research methods in nursing. The course includes substantial applications of established methodologies and effective research techniques within the quantitative paradigm. Prerequisite: Admission to the doctoral program and completion of a multivariate statistics course. S.

NURS 575. Qualitative Nursing Research. 3 Credits.
This course focuses on examination and analysis of qualitative research designs with particular emphasis on approaches relevant to phenomena in nursing. Students will conduct fieldwork to develop some beginning qualitative research skills. Prerequisite or Corequisite: Admission to Doctoral Program or consent of instructor. F.

NURS 576. Clinical Anesthesia Practicum V. 5 Credits.
This is the final capstone clinical practicum course that provides the student with the opportunity to develop full autonomy and proficiency in nurse anesthesia practice. The emphasis of this course is the integration of current evidence and advanced nursing knowledge with advanced clinical judgement, well developed clinical decision making, and total case management for diverse patient populations receiving anesthesia care. Professionalism and leadership within healthcare systems will be emphasized. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S/U grading. SS.

NURS 577. Rural Healthcare Ethics. 3 Credits.
This course is directed toward the development of critical dialogue and leadership strategies for dealing with ethical issues related to nursing, health care and research. Commitment to discussion, understanding and acceptance of the rights of others in dilemmas is emphasized. Reflexive nursing, which brings attention to one's own position and objectivity, is encouraged. The challenges of ethics in rural milieus are included in the discourse. Prerequisite: Admission to the Nursing doctoral Program or consent of the instructor. S.

NURS 578. Doctoral Seminar. 1 Credit.
Prerequisite: Admission to the Nursing doctoral Program or consent of the instructor.

NURS 580. Research Practicum. 1-6 Credits.
The doctoral research practicum provides a research experience for doctoral nursing students separate from the dissertation to participate in the research process under the guidance of an experienced/funded investigator. Experiences may include grant writing, data collection, analysis, and manuscript writing. Repeatable to 6 credits. F,S,SS.

NURS 581. The Nurse Scientist. 3 Credits.
This course prepares the doctoral student to actively engage in doctoral study with knowledge of the discipline of nursing and skills that facilitate success as an emerging nurse scientist. Prerequisite: Admission to PhD program. F.

NURS 583. Individual Therapy. 2 Credits.
This course provides knowledge and skill development in the implementation of evidence-based clinical therapies and treatments focused on the individual including cultural variations. Includes clinical practice. Prerequisites or Corequisites: NURS 500, NURS 502, NURS 510, NURS 511, NURS 514, NURS 523, NURS 535, NURS 538, NURS 539, and NURS 585.

NURS 584. Group and Family Therapies. 3 Credits.
Evidence-based clinical interventions with diverse groups and families are presented. Opportunities for clinical implementation accompany the theoretical models. A clinical/laboratory component is included. Prerequisites or Corequisites: NURS 538, NURS 583 and admission into Psychiatric Mental Health specialization or consent of instructor.

NURS 585. Advanced Health Assessment. 3 Credits.
An evidenced-based approach will be used to present methodologies for graduate student performance on health histories, developmental assessments, and physical/psychosocial assessments of individuals. Communication and interviewing techniques for advanced nursing practice are applied. A clinical/laboratory component is included with variations for Family Nurse Practitioner, Psych/Mental Health, Adult-Gerontology, and Nurse Anesthesia students. An on-campus intensive is required for this course. Prerequisite: Completion of an undergraduate course in health assessment techniques or consent of instructor. Prerequisite or Corequisite: NURS 510, F.S.

NURS 586. Rural Health Programs and Research. 3 Credits.
This course focuses on policies, programs and research related to rural health. Prerequisite: NURS 565 and NURS 558 or consent of instructor. F.

NURS 588. Management of Psychopathology I. 2 Credits.
This is the first of a two course sequence that focuses on the management of individuals across the lifespan, groups and families with or affected by psychopathology. Continuity of care across settings and community is emphasized. Prerequisites or Corequisites: NURS 564, NURS 584, and admission to the PMHNP program. Repeatable.

NURS 589. Management of Psychopathology II. 2 Credits.
This is the second of a two course sequence that focuses on the management of individuals across the lifespan, groups and families with or affected by psychopathology. Management of co-morbidities is emphasized. Prerequisite or Corequisite: NURS 588. S.

NURS 590. Directed Studies. 1-3 Credits.
Designed to meet the needs of individual and/or small groups of graduate students. The course content will be based on student interests and needs in conjunction with the faculty member's area of specialization. Prerequisite: Consent of instructor. Repeatable.

NURS 591. Readings in Nursing. 1-3 Credits.
Readings in selected nursing/health care topics with written and/or oral reports. Prerequisite: Consent of instructor. S/U grading. SS.

NURS 592. Advanced PHN Practicum III. 4 Credits.
This course provides a capstone experience in Advanced PHN practice. Students are expected to integrate knowledge from all of their previous coursework into an applied practicum experience in population health, to evaluate population health interventions and programs, and develop strategies for program funding. Prerequisites: NURS 548 and NURS 549.

NURS 593. DNP Internship I. 4 Credits.
This first DNA Internship course is designed to provide the DNA Advanced Practice Nurse (APN) student with opportunities to apply the concepts in the AACN DNA Essentials document in the practice environment. Students will also begin development of the DNA capstone project. Corequisite: NURS 598.

NURS 594. DNP Internship II. 4 Credits.
This course is designed to provide the DNP student with additional practice focused learning opportunities to apply the concepts in the AACN DNP Essentials document in the practice environment. The student will complete and disseminate findings from the capstone project. Prerequisite: NURS 593. Corequisite: NURS 599.

NURS 595. DNP Internship III. 4 Credits.
This course is designed to provide the DNP APN with additional practice focused learning opportunities to apply the concepts in the AACN DNP Essentials document in the practice environment. The student will complete the DNP capstone project and disseminate findings in presentations and publications. Prerequisites: NURS 593 and NURS 594. Corequisite: NURS 596.
NURS 597. Advanced Clinical Practicum. 1-12 Credits.
This clinical practicum course provides the student with the opportunity to obtain extended clinical experience in the area of specialization. The course focuses on the integration of theoretical knowledge into clinical practice. A clinical/laboratory component is included. Prerequisite: Completion of NURS 517 for Nurse Anesthesia specialization or completion of first year curriculum for the Family Nurse Practitioner, Psychiatric/Mental Health or Gerontology specializations. Repeatable. S/U grading.

NURS 600. Integrated DNP Core Concepts I. 3 Credits.
This course is an exploration of the core concepts that support the varying roles of the DNP prepared APRN as a practice focused leader and clinical scholar. Development of practice focused leadership skills in the care of rural and vulnerable populations will also be addressed. Prerequisite: Admission to the DNP Program. F.

NURS 601. Integrated DNP Core Concepts II. 3 Credits.
This course builds upon content covered in Integrated DNP Core Concepts I. Students continue to explore core concepts that support the varying roles of the role of the DNP prepared APRN practice focused leader and clinical scholar. In addition, students will critically examine the historical evolution of epidemiology and epidemiological concepts relevant in advanced nursing practice. Prerequisites: Admission to the DNP Program and NURS 600. S.

NURS 602. Evidence Based Research I. 3 Credits.
This course focuses on the development of practice scholarship through the use of evidence to address clinical problems and inform future practice. Students in the class will define practice problems, evaluate evidence based methods to address those problems and design practice focused projects to measure outcomes. Middle range theories will also be explored and used as frameworks for study designs. Statistics and previous Evidence Based Practice course is highly recommended. Prerequisite or Corequisite: Admission to the DNP program. F.

NURS 603. Evidence-Based Research II. 3 Credits.
This course focuses on the continued development of the practice scholar and includes content of research and program evaluation methods and analysis used to address practice problems and inform future evidence based practice. Prerequisite: NURS 602. Corequisite: NURS 609. S.

NURS 604. Health Informatics. 3 Credits.
This course prepares the health care practice professional to use and evaluate emerging health care technology and data systems to support evidence-based practice. Prerequisite: Admission to DNP Program or consent of instructor. SS.

NURS 605. Health Policy. 2 Credits.
This course will prepare the health care professional to understand and apply knowledge of health policy to function as an advocate for populations and individuals. Prerequisite: Admission to the DNP Program or consent of instructor. SS.

NURS 606. DNP Systems Focused Practice I. 2 Credits.
This course is designed to provide the DNP student with opportunities to apply the concepts in the AACN DNP Essentials in the practice environment. Prerequisite: NURS 603. SS.

NURS 607. DNP Systems Focused Practice II. 3 Credits.
This course continues to provide the DNP student with opportunities to apply the concepts in the AACN DNP Essentials in the practice environment. Prerequisites: NURS 603 and NURS 606. F.

NURS 608. Healthcare Economics, Finance and Leadership. 3 Credits.
This course focuses on healthcare economics, finance and practice leadership skills related to the role of the DNP prepared advanced practice nurse within the complex health care system. Prerequisite or Corequisite: Admission to the DNP program or consent of instructor. F.

NURS 609. DNP Project Teams. 1-6 Credits.
The student will design, implement and evaluate the DNP project as well as present findings in the applicable practice setting under the guidance of DNP faculty. Prerequisite: NURS 603. Repeatable to 6 credits. F,S,SS.

NURS 610. DNP Capstone. 2 Credits.
The capstone course provides the DNP students with an opportunity to develop skills in reporting and disseminating practice focused research findings. Writing for publication of practice focused research is emphasized. Prerequisite or Corequisite: NURS 609. S,SS.

NURS 611. Rural Healthcare Forum. 1 Credit.
This course focuses on interprofessional healthcare delivery to rural and underserved populations. Prerequisite or Corequisite: Admission to DNP program or consent of instructor. SS.

NURS 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

NURS 997. Independent Study. 2 Credits.

NURS 998. Thesis. 1-4 Credits.
Repeatable to 4 credits.

NURS 999. Dissertation. 1-15 Credits.
Repeatable to 15 credits.

Master of Science in Psychiatric Mental Health Nurse Practitioner

Admission Requirements
Approved admission to the Master of Science degree program requires the following of all students:
1. Completion of a baccalaureate degree or higher from an accredited nursing program
2. An undergraduate or graduate statistics course
3. A minimum GPA of at least 3.00 for the last two years of baccalaureate study (official transcripts must be submitted)
4. Current U.S. unencumbered RN licensure (upload Nursys verification report in application)
5. Three letters of recommendation
6. Current resume or curriculum vitae
7. Statement of goals
8. One year of experience as a registered nurse preferred – track specific experience desirable
9. Satisfy the School of Graduate Studies’ English Language proficiency requirements as published in the graduate catalog.
10. Interview may be required (via web, phone, or in person)
11. Successful passage of criminal background check and drug screen will be required upon offer of admission
12. Satisfaction of current health and immunization policy of the Department of Nursing will be required upon offer of admission

Degree Requirements
Students seeking the Master of Science degree with a major in Nursing degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the College of Nursing & Professional Disciplines.
1. A minimum of 30 semester credits in a major field.
2. At least one-half of the credits must be at or above the 500-level.
3. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.

Required Courses:
Psychiatric Mental Health Nursing Nurse Practitioner

NURS 500 Theories/Concepts Nursing 3
NURS 502 Evidence for Practice 3
NURS 505 Advanced Pharmacology 3
NURS 522 Advanced Pathophysiology 3
NURS 523 Health Promotion 3
NURS 538 Psych Diagnostic Reasoning 2
NURS 553 Role Development of the NP 2
NURS 564 Psychopharmacology 2
NURS 583 Individual Therapy 2
NURS 584 Group and Family Therapies 3
NURS 585 Advanced Health Assessment 3
NURS 588 Management of Psychopathology I 2
Courses

NURS 500. Theories/Concepts Nursing. 3 Credits.
The focus of this course is on analysis of current nursing and related theories and concepts which guide clinical practice, curriculum development, research, and nursing administration.

NURS 502. Evidence for Practice. 3 Credits.
This course emphasizes the application of basic research concepts to the building of evidence-based practice in nursing. Advanced competencies are developed in searching and evaluating the literature, examining the merit of different types and levels of evidence, and analyzing the generalizability and implications for clinical practice. Prerequisites or Corequisites: Admission to one of the Graduate Nursing Tracks, NURS 500 and statistics and/or permission of instructor. F.S.

NURS 503. The Business of Practice. 2 Credits.
This course focuses on the business aspects of inter-professional advanced practice in the complex health care environment. Prerequisite: Admission to the DNP Program.

NURS 504. Advanced Pharmacology I. 3 Credits.
Pharmacodynamic and pharmacokinetic principles with a focus on clinical anesthesia practice. Physiologic systems and drug classifications are used; emphasis on therapeutic use, side effects, drug interactions, and contraindications of drugs used for intravenous anesthesia induction, inhalation, and balanced anesthesia maintenance. Pediatric and geriatric variations will be addressed. Prerequisite: Admission to Nurse Anesthesia Specialization.

NURS 505. Advanced Pharmacology. 3 Credits.
The focus of this course is on the basic and advanced clinical concepts of pharmacology for the advanced practice nurse. Medication selection and administration will be addressed. Anatomy, physiology, and pathophysiology will be reviewed as appropriate to the physiologic system or medication class being discussed. Evidence-based guidelines with respect to the clinical application of medications utilized in selected acute and chronic health problems will be explored. Prerequisite or Corequisite: Admission to Graduate Nursing Program. F.

NURS 506. Advanced Pharmacology II. 3 Credits.
Advanced pharmacology for clinical nurse anesthesia practice. Prerequisite: NURS 504.

NURS 507. Anesthesia Seminar and Clinical Practicum. 4 Credits.
This course is designed to provide nurse anesthesia students an overview of the basic principles and skills needed to care for the routine surgical patient. Topics include difficult airway management, patient monitoring, patient preparation, positioning, patient safety, fluid and electrolyte management, documentation of anesthesia care, and an introduction to regional anesthesia. Analysis, integration, and utilization of research to improve practice is emphasized. The lecture content is reinforced through Clinical Simulation and laboratory experiences, allowing for immediate application of the lecture content and integration into the clinical setting. Students are introduced to the clinical setting through observational and hands-on experiences. Includes a clinical and/or laboratory component. Prerequisite: NURS 521.

NURS 508. Nurse Anesthesia Review Course. 1 Credit.
This course is faculty guided and designed to assist students with their review of nurse anesthesia course and clinical material in preparation for the CCNA certification examination. Prerequisite: Completion of all Nurse Anesthesia Specialization coursework.

NURS 509. Foundations for Nurse Education. 3 Credits.
This course begins to compare and contrast multiple roles and responsibilities of nurse educators in various settings in academic and health service. It will build the conceptual foundation for educational processes with emphasis on ethics, learning theories, taxonomies of learning and current evidence necessary for development of competencies necessary for the practice of educating. Students will begin to formulate their individual philosophy of teaching and learning. Prerequisite: Admission to the Nursing Graduate Program or consent of the instructor. Prerequisite or Corequisite: NURS 500. S.

NURS 510. Adv Physiology/Pathophysiology I. 3 Credits.
Normal physiologic functions associated with cellular structure and environment. Physiologic and pathophysiologic functions of the human body and its organ systems, both separately and integrated in whole activities. Prerequisite: Admissions to graduate study.

NURS 511. Adv Physiology/Pathophysiology II. 3 Credits.
Physiologic and pathophysiologic functions of the human body and its organ systems, both separately and integrated in whole activities. Prerequisite: NURS 510 or consent of instructor.

NURS 512. DNP Core Concepts I. 2 Credits.
This course is an exploration of the core concepts that support the developing role of the DNP as a practice focused leader and researcher. Prerequisite: Admission to the DNP Program.

NURS 513. DNP Core Concepts II. 2 Credits.
This course focuses on the concepts that support the development of the role of the DNP practice leader in the care of rural and vulnerable populations and issues related to planning and providing care for vulnerable and underserved populations. The primary content focus areas are epidemiology and vulnerability related to population and individual health. Prerequisites: Admission to the DNP Program and NURS 512. S.

NURS 514. Essentials in Epidemiology. 3 Credits.
This course will emphasize the application of the principles of epidemiology as applied to the investigation and prevention of individual and population health problems. Students will evaluate care delivery models and analyze epidemiological data to develop and apply strategies for health promotion and disease prevention for individuals, aggregates, and populations. The core competencies will focus not only on the practice of public health, but also enhance practice for the clinician. Prerequisite: Admission to the Graduate School, MPH Program, or permission of the the instructor. F.S.

NURS 515. Basic Principles of Anesthesia Practice I. 3 Credits.
This course provides an introduction to the fundamental principles necessary for the safe, professional, and individualized anesthetic care of diverse patients. Foundational concepts such as chemistry and physics as they apply to anesthesia practice, pharmacology of anesthetic agents, uncomplicated airway management, anesthesia delivery systems, and physiological monitoring will be investigated. Low and high fidelity patient simulation will be utilized to develop the student's cognitive and psychomotor skills which are essential to clinical anesthesia management. The course will conclude with a clinical component designed to acclimate beginning nurse anesthesia students to the clinical anesthesia arena. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. F.

NURS 516. Basic Principles of Anesthesia Practice II. 3 Credits.
This course builds upon the fundamentals covered in Basic Principles of Anesthesia I, all of which are necessary for the safe, professional, and individualized anesthetic care of diverse patients. Concepts such as basic perioperative anesthetic management, pain management, regional anesthesia, difficult airway management, effective oral and written communication, and patient and healthcare provider safety are emphasized. Low and high fidelity patient simulation will be utilized to develop the student's cognitive and psychomotor skills which are essential to clinical anesthesia management. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S.
NURS 517. Anesthesia Seminar and Clinical Practicum II. 5 Credits.
This course builds on the foundations learned in the prerequisite course. Advanced anesthesia principles are applied to various patient populations including the surgical patient with cardiovascular and respiratory diseases. Anesthesia care of other surgical populations including the trauma, orthopedic, urological, vascular, intra-abdominal and ENT patient will be explored. Important concepts include anatomical, physiological and pathophysiological, and pharmacological principles. Analysis, integration, and utilization of research to improve practice is emphasized. The lecture content is reinforced through simulated laboratory experiences, allowing for immediate application of the lecture content and integration into the clinical setting. A clinical rotation is included. Prerequisite: NURS 507.

NURS 518. Pharmacotherapeutics for Nurse Anesthesia. 2 Credits.
The focus of this course is on advanced clinical concepts of pharmacology relevant to the nurse anesthetist during the perioperative period. This course utilizes concepts from NURS 505 Advanced Pharmacology and further advances the student’s knowledge in pharmacological concepts related to the practice of anesthesia. This course will examine the clinical application of anesthesia specific pharmacologic principles into formulating anesthetic plans for diverse patient populations. Prerequisite or Corequisite: NURS 505; Admission to the DNP Program - Nurse Anesthesia Track. S.

NURS 519. Practice Leadership. 2 Credits.
This course focuses on practice leadership theories and strategies related to the role of the DNP advanced practice nurse within the complex health care system. Prerequisite: Admission to DNP Program or consent of instructor.

NURS 520. Prof Role Dvlpmnt/Nurse Ansthsia. 3 Credits.
The focus of this course is on the identification and analysis of the professional components of nurse anesthesia practice, emphasizing role development; management and leadership; medical, ethical and legal responsibilities; the provision of culturally competent care; and scope of professional practice. Other areas that will be explored include quality improvement, the legislative process, credentialing, professional organizations, conflict resolution, and self-care and stress management for the anesthetist. An in-depth analysis of current trends and issues affecting healthcare and the delivery of anesthesia services are included in the course content. Prerequisites: NURS 521 and NURS 507. Corequisite: NURS 517.

NURS 521. Foundations of Anesthesia Practice. 3 Credits.
This course provides the foundation for nurse anesthesia practice. Lecture and discussion begin with an analysis of the history of anesthesia nursing, professionalism, and standards of care for the anesthetist. Safety in the nurse anesthesia environment will be emphasized. Additional content includes the applied chemical, physical, and biochemical concepts as they relate to anesthesia practice. Including the mechanisms of anesthesia, medical mathematics, medical gas systems, laws governing gases, the anesthesia machine, monitoring principles and equipment, airway equipment and basic airway management, and universal precautions. Prerequisite: Admission to the Nurse Anesthesia Specialization.

NURS 522. Advanced Pathophysiology. 3 Credits.
This course presents a system-focused approach to alterations in normal physiological mechanisms that result in pathologic disease processes. Physiological changes are compared and contrasted over the lifespan and developmental cellular physiology, pathogenesis and clinical manifestations commonly observed in altered health states are reviewed. This knowledge serves as the foundation for advanced clinical assessment, decision making and management for the advanced practice nurse. Prerequisite: Admission to graduate study. F,S,SS.

NURS 523. Health Promotion. 3 Credits.
Paradigms in health promotion, health detection, and disease prevention across the lifespan are used in synthesis in theory and evidence-based primary care interventions. Prerequisite: Admission to the Nursing Graduate Program or consent of the instructor. F,S.

NURS 524. Anatomy for Nurse Anesthetists. 1 Credit.
This course builds upon the concepts and fundamentals of Basic Principles of Anesthesia I and II as it relates to the detailed regional anatomy of the human body. A cadaver laboratory experience will be utilized throughout the course to develop the student’s understanding of clinical anatomy related to the airway, central nervous system, peripheral nerves, cardiovascular system, and pulmonary system with an anesthesia context. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S.

NURS 525. Applied Multivariate Statistics. 3 Credits.
Principles, assumptions and applications of major multivariate statistical techniques commonly used in nursing and clinical health research. Prerequisite: Graduate level univariate statistics and admission to the Nursing Doctoral Program or consent of the instructor. F.

NURS 526. Ethical, Legal and Health Policy Issues. 3 Credits.
This course emphasizes health policy issues within the context of legal and ethical concepts. Students will examine and debate health policies in current practice, thus broadening their ability to analyze, implement, and evaluate health policy issues.

NURS 527. Anesthesia Seminar and Clinical Practicum III. 5 Credits.
This course further builds on the foundations learned in prerequisite courses. Students will incorporate previously learned anatomy, physiology, pathophysiology, and patient management into the care of subspecialty patients and patients with complex co-existing diseases. Advanced anesthesia principles are applied to the OB, pediatric, geriatric, and neuro patient. The pharmacology and anesthesia management of these subspecialty populations and patients with various disease states, such as kidney, musculoskeletal, and endocrine disorders, will be explored. Analysis, integration, and utilization of research to improve clinical practice is emphasized. The lecture content is reinforced with a clinical experience that emphasizes anesthesia care for subspecialty populations. A clinical/laboratory component is included. Prerequisite: NURS 517.

NURS 528. Advanced Principles of Anesthesia Practice I. 4 Credits.
This course builds upon the nurse anesthesia foundations covered previously in the Basic Principles of Anesthesia I and II courses. An evidence based approach to the anaesthetic evaluation, planning, and management of diverse and increasingly complex patient populations, such as those with pre-existing respiratory, cardiac, and renal diseases, will be the focus. The hands-on administration of safe, individualized, and comprehensive anesthetic plans of care to both simulated and actual patients will be introduced and emphasized. Low and high fidelity patient simulation will be utilized to continue developing the student’s cognitive and psychomotor skills which are essential to perform clinical anesthesia management. A clinical component will allow the student to apply theoretical principles to nurse anesthesia practice and to increase their clinical skills, knowledge, and autonomy. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. SS.

NURS 529. Advanced Principles of Anesthesia Practice II. 6 Credits.
This course builds on the foundations covered in Basic Principles of Anesthesia I and II along with Advanced Principles I including the evaluation, planning, and management of diverse and increasingly complex patient populations. Evidence-based advanced principles of anesthesia care will be investigated in order to construct comprehensive and individualized anesthetic plans of care for the management of subspecialty patients. Obstetrical and pediatric populations, as well as patients with complex co-existing diseases and/or those undergoing complex surgical procedures will be the focus. Low and high fidelity patient simulation will be utilized to continue developing the student’s cognitive and psychomotor skills which are essential to perform clinical anesthesia management. A clinical component will allow the student to apply theoretical principles to nurse anesthesia practice and to increase their clinical skills, knowledge, and autonomy. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. F.

NURS 530. Research Design & Methods in Nursing. 3 Credits.
Prerequisite or corequisite: NURS 500 or consent of instructor.

NURS 531. Adult-Gerontology Illness Management I. 3 Credits.
This is the first of a two-course sequence that focuses on evidenced-based primary care diagnosis and management of common episodic/chronic problems encountered by young adults, adults and older adults and their social network in ambulatory, inpatient, and community settings. Physiological, psychosocial, and pharmacological interventions are integrated into the holistic care that incorporates age-related, cultural, family, and community variations. An on-campus intensive is required for this course. Prerequisites: NURS 511 and NURS 585. Corequisite: NURS 597. F.

NURS 532. Family Centered Advance Practice Nursing. 3 Credits.
Theoretical and scientific foundations for advanced practice nursing care for the family-as-a-unit in health and illness across the lifespan. Prerequisite: Admission to DNP program or consent of instructor. S.
NURS 533. Adult-Gerontology Illness Management II. 3 Credits.
This is the second of a two-course sequence that focuses on evidenced-based primary care diagnosis and management of common episodic/chronic problems encountered by young adults, adults and older adults and their social network in ambulatory, inpatient, and community settings. Physiological, psychosocial, and pharmacological interventions are integrated into the holistic care that incorporates age-related, cultural, family, and community variations. An on-campus intensive is required for this course. Prerequisite: NURS 531. Corequisite: NURS 597. S.

NURS 534. Management of Health Conditions in Primary Care I. 3 Credits.
This is the first of a two-course sequence that focuses on evidenced-based primary care diagnosis and management of common episodic/chronic problems encountered by adults, including young adults, middle aged adults and older adults and their social network in ambulatory, inpatient, and community settings. Physiological, psychosocial, and pharmacological interventions are integrated into the holistic care that incorporates age-related, cultural, family, and community variations. Prerequisites: NURS 522 and NURS 585. Corequisite: NURS 597 (II). F,S,SS.

NURS 535. Advanced Pharmacology for Primary Care I. 2 Credits.
Pharmacological agents utilized to treat common acute and chronic health problems are explored in depth. The course focus is on advanced nursing practice roles related to prescription, pharmacological, and therapeutic applications of the drugs. Prerequisite: Admission to the Nursing Graduate Program or consent of the instructor. Prerequisite or corequisite: NURS 510. F,S.

NURS 536. Advanced Nurse Educator Practice of Health Promotion. 2 Credits.
This practicum course affords the Nurse Educator student with opportunities to develop advanced skills in teaching-learning practices in the rural health care environments. The student will apply educational theories and best-evidence teaching strategies with a particular emphasis in education related to health promotion strategies. This course will include topics such as the Nurse Educator role to promote health in rural communities, assess health literacy, and develop appropriate patient educational materials. The practicum emphasizes health promotion education to meet diverse needs of rural dwelling patients, families and groups. Prerequisites: NURS 500, NURS 511, NURS 539, and NURS 514. Corequisite: NURS 526, and NURS 569. F.

NURS 537. Graduate Cooperative Education. 1-2 Credits.
The course focus is upon experience in advanced nursing practice integrating theory, research, and advanced practice in a specific area of nursing. Course overview: the purpose of this course is to provide the graduate nursing student with advanced nursing practice as an employee in a health care agency and to evaluate that experience in relation to the educational program. A clinical/laboratory component is included. Prerequisite: Permission of Graduate Director of Nursing. Repeatable to 9 credits.

NURS 538. Psych Diagnostic Reasoning. 2 Credits.
This course prepares students for advanced therapeutic communication, interviewing, and assessment of people with mental illness across the life span. Skills are developed in differential diagnoses of psychopathology within the scope and standards of advanced psychiatric mental health nursing practice. Clinical application is included. Prerequisite: Acceptance into the PMHN program or permission of instructor. S.

NURS 539. Advanced Pharmacology for Primary Care II. 2 Credits.
Pharmacological agents utilized to treat common acute and chronic health problems are explored in depth. The course focus is on advanced nursing practice roles related to prescription, pharmacological, and therapeutic applications of the drugs. Prerequisite: Admission to nursing graduate program and NURS 535 or consent of instructor. F,S.

NURS 540. Management of Health Conditions in Primary Care II. 3 Credits.
Clinical decision making skills are developed in the diagnosis and management of acute and chronic health conditions throughout the lifespan. Health promotion, health protection, and disease prevention are emphasized. Prerequisite: NURS 534. F,S,SS.

NURS 541. Illness Management - Adult Gerontology I. 3 Credits.
This is the first of a two-course sequence focusing on evidence-based primary care specific to the adult-gerontology population which includes adolescents, young adults and frail, older adults. This course prepares students to provide healthcare services across the adult-gerontology age spectrum from wellness to illness, using scientific knowledge and theoretical foundations to differentiate between normal and abnormal changes in physiological, psychological and sociological development and aging. Students will develop strategies to provide and coordinate interdisciplinary and holistic care that incorporates age-related, cultural, family, and community variations. Prerequisites: NURS 522, NURS 585, and NURS 597 (I). Corequisite: NURS 597 (II). F,S,SS.

NURS 542. Professional Aspects of Nurse Anesthesia Practice. 3 Credits.
This course provides the entry-level nurse anesthetist student with a foundational knowledge of professional aspects related to nurse anesthesia practice. The focus of this course is on historical perspectives, professional role development, anesthesia business practices, and professional wellness. Prerequisite: Admission to the DNP Program - Nurse Anesthesia Track. F.

NURS 543. Illness Management - Adult Gerontology II. 3 Credits.
This is the second of a two-course sequence that focuses on evidence based primary care specific to the adult-gerontology populations which includes adolescents and young adults to frail, older adults. Course work focuses on evidence based acute and chronic care diagnosis and management of common episodic acute and chronic problems encountered by the adult - gerontological population. Physiological, psychosocial, and pharmacological assessments, including changes associated with aging and development across the adolescent - adult continuum are integrated into the formation of differential diagnosis and interventions of clinical problems in collaboration with other care providers. Prerequisites: NURS 541 and NURS 597 (II). Corequisite: NURS 597 (III). F,S,SS.

NURS 544. Pharmacotherapeutics for Primary Care. 2 Credits.
This course will help prepare the advance practice nursing student for prescriptive authority. Topics will focus on decision making regarding the pharmacological management of common acute and chronic illnesses encountered in primary care settings. Pharmacokinetics, pharmacodynamics, adverse drug reactions, and contraindications will be discussed. Ethical and legal principles of writing prescriptions will also be covered. Students will synthesize research findings related to various medications using case study and discussion. Prerequisites: Admission to DNP program (FNP, AGNP tracks), and NURS 505. S.

NURS 545. Care of the Frail Older Adult. 3 Credits.
In this course the advanced practice nursing student will focus on the complex and multifactorial health care needs of frail elders. Students will develop strategies to provide and coordinate interdisciplinary and holistic care of the frail elderly in a variety of settings. Prerequisite: Admission to DNP program or consent of instructor. S.

NURS 546. Advanced PHN I. 4 Credits.
NURS 546 introduces concepts foundational to advanced PHN practice and population health. Corequisite: NURS 547.

NURS 547. Advanced PHN Practicum I. 4 Credits.
The focus of this course is on application of foundational concepts of Advanced PHN practice. Students will conduct a community assessment and identify community problems and strengths. Written and oral communication skills are emphasized. Corequisite: NURS 546.

NURS 548. Advanced PHN II. 3 Credits.
This course focuses on the leadership role of advanced PHN practice. Public health, community-based organization assessment and program monitoring and evaluation, quality improvement, and management of multiple projects are emphasized. Concepts of leadership in public and community health and collaborative interdisciplinary practice are discussed. Health policy and law and ethics as they relate to public health are explored. In addition, advanced PHN leadership in rural areas and in disaster/emergency preparedness and management are discussed. Prerequisites: NURS 502, NURS 546, and NURS 547. Corequisite: NURS 548.

NURS 549. Advanced PHN Practicum II. 3 Credits.
This course focuses on implementation of advanced PHN interventions. Corequisite: NURS 548.

NURS 550. Global Public Health Issues. 2 Credits.
This course focuses on population health issues at a global level. Differences in population health status between developing and developed countries are explored. Special emphasis is placed on war as a public health issue and the global impact of AIDS.
NURS 552. Role Development of the CNS. 2 Credits.
Students will compare and contrast the various roles of the clinical nurse specialist and evaluate those roles as they relate to their individual area of practice. Concepts of professional development are emphasized. Prerequisite: NURS 502.

NURS 553. Role Development of the NP. 2 Credits.
This course emphasizes professional role development of the nurse practitioner. Students will compare and contrast the various roles of the nurse practitioner and evaluate those roles as they relate to the student's individual planned area of practice. Prerequisite: NURS 502.

NURS 554. Writing for Publication. 2 Credits.
The course is designed to provide students with knowledge and skills necessary to meet the PhD program requirement and milestone of preparing and submitting a manuscript for publication in a peer-reviewed journal. The achievement of this milestone is foundational for scientific inquiry and the development of nurse scientists. Prerequisite: Consent of Instructor or Advisor. S/U grading. F,S,SS.

NURS 555. Grant Submission. 2 Credits.
The course results in the development and submission of a pre-doctoral, federally-funded research grant proposal, or equivalent with advisor approval. The course builds upon previous doctoral coursework covering grantsmanship and issues in preparing funded research proposals and grant budgets. Prerequisites: NURS 573 and consent of Instructor or Advisor. F,S,SS.

NURS 556. PhD Student Intensive. 1 Credit.
This course immerses the student into a community of scholars during an annual on-campus intensive experience. The student will participate in a variety of presentations, workshops, and activities which focus on development into the role of a nurse scientist and scholar. The course uses a variety of activities which help the student develop into the role of a nurse scientist and scholar. Prerequisite: Admission to the Nursing PhD program. Repeatable to 5 credits. S/U grading. F.S.

NURS 557. Foundations of Nursing Science. 3 Credits.
The epistemology and philosophy of nursing as an art and a science are examined. Patterns of knowing as well as clinical, conceptual, and empirical types of nursing knowledge will be discussed. The development of theory as a knowledge claim is analyzed. Prerequisites: Masters Level Nursing Theory Course and Admission to PhD Program. S.

NURS 558. Research Design. 3 Credits.
This course prepares the doctoral student to understand the link between research design and the study purpose. Prerequisite: Admission to PhD program or consent of instructor. F.

NURS 559. Maternal and Child Health in Primary Care. 2 Credits.
This course focuses on advanced practice nursing care of obstetric and pediatric clients within a primary care setting. An on-campus intensive is required for this course. Prerequisites: Admission to FNP, NURS 510, NURS 511, NURS 523, and NURS 585. SS.

NURS 560. Clinical Anesthesia Practicum I. 5 Credits.
This is the first of five clinical practicum courses that build upon one another and provides students the opportunity to obtain the clinical experiences necessary to develop increasing proficiency in nurse anesthesia practice. The emphasis of this course is the integration of current evidence and advanced nursing knowledge with decision making and case management for diverse patient populations, receiving anesthesia care. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S/U grading. S.

NURS 561. Clinical Anesthesia Practicum II. 3 Credits.
This is the second of five clinical practicum courses designed to provide the student with the opportunity to obtain clinical experiences necessary to develop increasing proficiency in nurse anesthesia practice. The emphasis of this course is the integration of current evidence and advanced nursing knowledge with decision making and case management for the diverse and increasingly more complex patient populations receiving anesthesia care. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S/U grading. SS.

NURS 562. Clinical Anesthesia Practicum III. 4 Credits.
This is the third of five clinical practicum courses that provides the student with the opportunity to obtain clinical experiences necessary to develop increasing proficiency in nurse anesthesia practice. The emphasis of this course is the integration of current evidence and advanced nursing knowledge with decision making and case management for the diverse, increasingly complex, patient populations receiving anesthesia care. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S/U grading. F.

NURS 563. Clinical Anesthesia Practicum IV. 6 Credits.
This is the fourth of five clinical practicum courses that provides the student with the opportunity to obtain clinical experiences necessary to develop increasing proficiency in nurse anesthesia practice. The emphasis of this course is the integration of current evidence and advanced nursing knowledge with decision making and case management for diverse patient populations, of all acuity levels, receiving anesthesia care. Emphasis will also be placed on student autonomy, continuing professional role development, and leadership skills. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S/U grading. S.

NURS 564. Psychopharmacology. 2 Credits.
This course provides the advanced practice student with knowledge in the pharmacology of psychopathology across the life span. Emphasis will be placed on the appropriate use of pharmaceuticals for psychiatric disabilities/disorders including: Mood disorders, development disorders, psychotic disorders, anxiety disorders, dementia, and substance abuse. Prerequisite: Admission to PMHNP program or permission of instructor. S.

NURS 565. Rural Populations and Rural Health. 3 Credits.
This course provides an overview of characteristics of rural populations and rural health. Factors that contribute to health, morbidity, and mortality are examined, and the compounded vulnerability of rurality and disadvantaged groups is analyzed. Prerequisite: A graduate level Epidemiology course or permission of instructor. S.

NURS 566. Curriculum Development. 3 Credits.
This course focuses on the curriculum development process. Societal, professional, and institutional factors as well as current research findings influencing the curriculum development process are analyzed. Consideration of the impact of adult learning principles, workforce issues, legal-ethical concerns, and diverse student populations in regard to the curriculum development process is given. Prerequisite: NURS 509.

NURS 567. Teaching Methodologies. 3 Credits.
The course explores theory-based teaching strategies designed to develop cognitive abilities, psychomotor skills, and affective qualities in learners from diverse backgrounds. Strategies and methods for the teaching of nursing content in a variety of settings are utilized. The use of technological tools in nursing education is evaluated. Prerequisite or corequisite: NURS 566.

NURS 568. Teaching Practicum. 2 Credits.
Students assume the role of the nurse educator in selected learning settings under the guidance of a preceptor. A clinical/laboratory component is included. Prerequisites: NURS 566 and NURS 567 and NURS 589, or consent of instructor.

NURS 569. Assessment and Evaluation. 3 Credits.
Principles of assessment, measurement, and evaluation are analyzed in this course as they relate to nursing education. The processes of assessing student learning, teaching, and program outcomes are explored. Topics relevant to the evaluation of individual student learning such as test development, evaluation of critical thinking, and clinical evaluation are included. The processes of faculty and program evaluation are examined. Prerequisites: NURS 566 and NURS 567, or consent of instructor.

NURS 572. Diverse Vulnerable Populations. 3 Credits.
Students will explore a wide range of concepts as they apply to diverse and vulnerable populations. The focus of the course is on understanding concepts and principles important to nursing when doing research, planning health care, developing health policy, and teaching in this area. Prerequisite: Admission to the Nursing Graduate Program or consent of the instructor.

NURS 573. Research Funding. 3 Credits.
This course integrates the scientific and practical aspects of professional writing and grant proposal development to obtain funds for research. Prerequisite: Admission to the graduate nursing program or approval of instructor. Prerequisite or Corequisite: NURS 574 and/or NURS 575. Non-nursing programs: Graduate level quantitative and/or qualitative research methods coursework required. F.
NURS 574. Quantitative Nursing Methods. 3 Credits.
The purpose of this course is to acquire knowledge and skills necessary to apply quantitative research methods in nursing. The course includes substantial applications of established methodologies and effective research techniques within the quantitative paradigm. Prerequisite: Admission to the doctoral program and completion of a multivariate statistics course. S.

NURS 575. Qualitative Nursing Research. 3 Credits.
This course focuses on examination and analysis of qualitative research designs with particular emphasis on approaches relevant to phenomena in nursing. Students will conduct fieldwork to develop some beginning qualitative research skills. Prerequisite or Corequisite: Admission to Doctoral Program or consent of instructor. F.

NURS 576. Clinical Anesthesia Practicum V. 5 Credits.
This is the final capstone clinical practicum course that provides the student with the opportunity to develop full autonomy and proficiency in nurse anesthesia practice. The emphasis of this course is the integration of current evidence and advanced nursing knowledge with advanced clinical judgement, well developed clinical decision making, and total case management for diverse patient populations receiving anesthesia care. Professionalism and leadership within healthcare systems will be emphasized. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S/U grading. SS.

NURS 577. Rural Healthcare Ethics. 3 Credits.
This course is directed toward the development of critical dialogue and leadership strategies for dealing with ethical issues related to rural, health care and research. Commitment to discussion, understanding and acceptance of the rights of others in dilemmas is emphasized. Reflexive nursing, which brings attention to one's own position and objectivity, is encouraged. The challenges of ethics in rural milieus are included in the discourse. Prerequisite: Admission to the Nursing doctoral Program or consent of the instructor. S.

NURS 578. Doctoral Seminar. 1 Credit.
Prerequisite: Admission to the Nursing doctoral Program or consent of the instructor.

NURS 580. Research Practicum. 1-6 Credits.
The doctoral research practicum provides a research experience for doctoral nursing students separate from the dissertation to participate in the research process under the guidance of an experienced/funded investigator. Experiences may include grant writing, data collection, analysis, and manuscript writing. Repeatable to 6 credits. F,S,SS.

NURS 581. The Nurse Scientist. 3 Credits.
This course prepares the doctoral student to actively engage in doctoral study with knowledge of the discipline of nursing and skills that facilitate success as an emerging nurse scientist. Prerequisite: Admission to PhD program. F.

NURS 583. Individual Therapy. 2 Credits.
This course provides knowledge and skill development in the implementation of evidence-based clinical therapies and treatments focused on the individual including cultural variations. Includes clinical practice. Prerequisites or corequisites: NURS 500, NURS 502, NURS 510, NURS 511, NURS 514, NURS 523, NURS 535, NURS 538, NURS 539, and NURS 585.

NURS 584. Group and Family Therapies. 3 Credits.
Evidence-based clinical interventions with diverse groups and families are presented. Opportunities for clinical implementation accompany the theoretical models. A clinical/laboratory component is included. Prerequisites or corequisites: NURS 558, NURS 583 and admission into Psychiatric Mental Health specialization or consent of instructor.

NURS 585. Advanced Health Assessment. 3 Credits.
An evidenced-based approach will be used to present methodologies for graduate student performance on health histories, developmental assessments, and physical/psychosocial assessments of individuals. Communication and interviewing techniques for advanced nursing practice are applied. A clinical/laboratory component is included with variations for Family Nurse Practitioner, Psych/Mental Health, Adult Gerontology, and Nurse Anesthesia students. An on-campus intensive is required for this course. Prerequisite: Completion of an undergraduate course in health assessment techniques or consent of instructor. Prerequisite or corequisite: NURS 510. F,S.

NURS 586. Rural Health Programs and Research. 3 Credits.
This course focuses on policies, programs and research related to rural health. Prerequisite: NURS 565 and NURS 558 or consent of instructor. F.

NURS 588. Management of Psychopathology I. 2 Credits.
This is the first of a two course sequence that focuses on the management of individuals across the lifespan, groups and families with or affected by psychopathology. Continuity of care across settings and community are emphasized. Prerequisites or Corequisites: NURS 564, NURS 584, and admission to the PMHN program.

NURS 589. Management of Psychopathology II. 2 Credits.
This is the second of a two course sequence that focuses on the management of individuals across the lifespan, groups and families with or affected by psychopathology. Management of co-morbidities is emphasized. Prerequisite or Corequisite: NURS 588. S.

NURS 590. Directed Studies. 1-3 Credits.
Designed to meet the needs of individual and/or small groups of graduate students. The course content will be based on student interests and needs in conjunction with the faculty member's area of specialization. Prerequisite: Consent of instructor. Repeatable.

NURS 591. Readings in Nursing. 1-3 Credits.
Readings in selected nursing/health care topics with written and/or oral reports. Prerequisite: Consent of instructor. Repeatable.

NURS 592. Advanced PHN Practicum III. 4 Credits.
This course provides a capstone experience in Advanced PHN practice. Students are expected to integrate knowledge from all of their previous coursework into an applied practicum experience in population health, to evaluate population health interventions and programs, and develop strategies for program funding. Prerequisites: NURS 548 and NURS 549.

NURS 593. DNP Internship I. 4 Credits.
This first DNA Internship course is designed to provide the DNA Advanced Practice Nurse (APN) student with opportunities to apply the concepts in the AACN DNA Essentials document in the practice environment. Students will also begin development of the DNA capstone project. Corequisite: NURS 598.

NURS 594. DNP Internship II. 4 Credits.
This course is designed to provide the DNP student with additional practice focused learning opportunities to apply the concepts in the AACN DNP Essentials document in the practice environment. The student will complete and disseminate findings from the capstone project. Prerequisite: NURS 593. Corequisite: NURS 599.

NURS 595. DNP Internship III. 4 Credits.
This course is designed to provide the DNP APN with additional practice focused learning opportunities to apply the concepts in the AACN DNP Essentials document in the practice environment. The student will complete the DNP capstone project and disseminate findings in presentations and publications. Prerequisites: NURS 593 and NURS 594. Corequisite: NURS 596.

NURS 597. Advanced Clinical Practicum. 1-12 Credits.
This clinical practicum course provides the student with the opportunity to obtain extended clinical experience in the area of specialization. The course focuses on the integration of theoretical knowledge into clinical practice. A clinical/laboratory component is included. Prerequisite: Completion of NURS 517 for Nurse Anesthesia specialization or completion of first year curriculum for the Family Nurse Practitioner, Psychiatric/Mental Health or Gerontology specializations. Repeatable. S/U grading.

NURS 600. Integrated DNP Core Concepts I. 3 Credits.
This course is an exploration of the core concepts that support the varying roles of the DNP prepared APRN as a practice focused leader and clinical scholar. Development of practice focused leadership skills in the care of rural and vulnerable populations will also be addressed. Prerequisite: Admission to the DNP Program. F.

NURS 601. Integrated DNP Core Concepts II. 3 Credits.
This course builds upon content covered in Integrated DNP Core Concepts I. Students continue to explore core concepts that support the varying roles of the role of the DNP prepared APRN practice focused leader and clinical scholar. In addition, students will critically examine the historical evolution of epidemiology and epidemiological concepts relevant in advanced nursing practice. Prerequisites: Admission to the DNP Program and NURS 600. S.
NURS 602. Evidence Based Research I. 3 Credits.
This course focuses on the development of practice scholarship through the use of evidence to address clinical problems and inform future practice. Students in the class will define practice problems, evaluate evidence based methods to address those problems and design practice focused projects to measure outcomes. Middle range theories will also be explored and used as frameworks for study designs. Statistics and previous Evidence Based Practice course is highly recommended. Prerequisite or Corequisite: Admission to the DNP program. F.

NURS 603. Evidence-Based Research II. 3 Credits.
This course focuses on the continued development of the practice scholar and includes content of research and program evaluation methods and analysis used to address practice problems and inform future evidence based practice. Prerequisite: NURS 602. Corequisite: NURS 609. S.

NURS 604. Health Informatics. 3 Credits.
This course prepares the health care practice professional to use and evaluate emerging health care technology and data systems to support evidence-based practice. Prerequisite: Admission to DNP Program or consent of instructor. SS.

NURS 605. Health Policy. 2 Credits.
This course will prepare the health care professional to understand and apply knowledge of health policy to function as an advocate for populations and individuals. Prerequisite: Admission to the DNP Program or consent of instructor. SS.

NURS 606. DNP Systems Focused Practice I. 2 Credits.
This course is designed to provide the DNP student with opportunities to apply the concepts in the AACCN DNP Essentials in the practice environment. Prerequisite: NURS 603. SS.

NURS 607. DNP Systems Focused Practice II. 3 Credits.
This course continues to provide the DNP student with opportunities to apply the concepts in the AACCN DNP Essentials in the practice environment. Prerequisites: NURS 603 and NURS 606. F.

NURS 608. Healthcare Economics, Finance and Leadership. 3 Credits.
This course focuses on healthcare economics, finance and practice leadership skills related to the role of the DNP prepared advanced practice nurse within the complex health care system. Prerequisite or Corequisite: Admission to the DNP program or consent of instructor. F.

NURS 609. DNP Project Teams. 1-6 Credits.
The student will design, implement and evaluate the DNP project as well as present findings in the applicable practice setting under the guidance of DNP faculty. Prerequisite: NURS 603. Repeatable to 6 credits. F,S,SS.

NURS 610. DNP Capstone. 2 Credits.
The capstone course provides the DNP students with an opportunity to develop skills in reporting and disseminating practice focused research findings. Writing for publication of practice focused research is emphasized. Prerequisite or Corequisite: NURS 609. S,SS.

NURS 611. Rural Healthcare Forum. 1 Credit.
This course focuses on interprofessional healthcare delivery to rural and underserved populations. Prerequisite or Corequisite: Admission to DNP program or consent of instructor. SS.

NURS 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

NURS 997. Independent Study. 2 Credits.

NURS 998. Thesis. 1-4 Credits.
Repeatable to 4 credits.

NURS 999. Dissertation. 1-15 Credits.
Repeatable to 15 credits.

Master of Science in Family Nurse Practitioner

Admission Requirements
Approved admission to the Master of Science degree program requires the following of all students:

1. Completion of a baccalaureate degree or higher from an accredited nursing program

2. An undergraduate or graduate statistics course

3. A minimum GPA of at least 3.00 for the last two years of baccalaureate study

4. (official transcripts must be submitted)

5. Current U.S. unencumbered RN licensure (upload Nursys verification report in application)

6. Three letters of recommendation

7. Current resume or curriculum vitae

8. Statement of goals

9. One year of experience as a registered nurse preferred – track specific experience desirable

10. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

11. Interview may be required (via web, phone, or in person)

12. Successful passage of criminal background check and drug screen will be required upon offer of admission

13. Satisfaction of current health and immunization policy of the Department of Nursing will be required upon offer of admission

Degree Requirements
Students seeking the Master of Science degree with a major in Nursing at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the College of Nursing & Professional Disciplines.

1. A minimum of 30 semester credits in a major field.

2. At least one-half of the credits must be at or above the 500-level.

3. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.

Required Courses:
Family Nurse Practitioner
(mostly on-line courses)

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<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
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<tr>
<td>NURS 500</td>
<td>Theories/Concepts Nursing</td>
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<td>NURS 502</td>
<td>Evidence for Practice</td>
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<td>NURS 505</td>
<td>Advanced Pharmacology</td>
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<td>NURS 522</td>
<td>Advanced Pathophysiology</td>
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<td>NURS 523</td>
<td>Health Promotion</td>
<td>3</td>
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<tr>
<td>NURS 532</td>
<td>Family Centered Advanced Practice Nursing</td>
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<td>NURS 534</td>
<td>Management of Health Conditions in Primary Care</td>
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<td>Role Development of the NP</td>
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<td>NURS 559</td>
<td>Maternal and Child Health in Primary Care</td>
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<td>NURS 585</td>
<td>Advanced Health Assessment</td>
<td>3</td>
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<td>NURS 597</td>
<td>Advanced Clinical Practicum (I)</td>
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<td>NURS 997</td>
<td>Independent Study</td>
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Total Credits: 49

Adult Gerontology Primary Care Nurse Practitioner

M.S. in Adult Gerontology Primary Care Nurse Practitioner (p. 509)

Courses

NURS 500. Theories/Concepts Nursing. 3 Credits.
The focus of this core course is on analysis of current nursing and related theories and concepts which guide clinical practice, curriculum development, research, and nursing administration.
NURS 502. Evidence for Practice. 3 Credits.
This course emphasizes the application of basic research concepts to the building of evidence-based practice in nursing. Advanced competencies are developed in searching and evaluating the literature, examining the merit of different types and levels of evidence, and analyzing the generalizability and implications for clinical practice. Prerequisites or Corequisites: Admission to one of the Graduate Nursing Tracks, NURS 500 and statistics and/or permission of instructor. F,S.

NURS 503. The Business of Practice. 2 Credits.
This course focuses on the business aspects of inter-professional advanced practice in the complex health care environment. Prerequisite: Admission to the DNP Program.

NURS 504. Advanced Pharmacology I. 3 Credits.
Pharmacodynamic and pharmacokinetic principles with a focus on clinical anesthesia practice. Physiologic systems and drug classifications are used; emphasis on therapeutic use, side effects, drug interactions, and contraindications of drugs used for intravenous anesthesia induction, inhalation, and balanced anesthesia maintenance. Pediatric and geriatric variations will be addressed. Prerequisite: Admission to Nurse Anesthesia Specialization.

NURS 505. Advanced Pharmacology. 3 Credits.
The focus of this course is on the basic and advanced clinical concepts of pharmacology for the advanced practice nurse. Medication selection and administration will be addressed. Anatomy, physiology, and pathophysiology will be reviewed as appropriate to the physiologic system or medication class being discussed. Evidence-based guidelines with respect to the clinical application of medications utilized in selected acute and chronic health problems will be explored. Prerequisite or Corequisite: Admission to Graduate Nursing Program. F.

NURS 506. Advanced Pharmacology II. 3 Credits.
Advanced pharmacology for clinical nurse anesthesia practice. Prerequisite: NURS 504.

NURS 507. Anesthesia Seminar and Clinical Practicum. 4 Credits.
This course is designed to provide nurse anesthesia students an overview of the basic principles and skills needed to care for the routine surgical patient. Topics include difficult airway management, patient monitoring, patient preparation, positioning, patient safety, fluid and electrolyte management, documentation of anesthesia care, and an introduction to regional anesthesia. Analysis, integration, and utilization of research to improve practice is emphasized. The lecture content is reinforced through Clinical Simulation and laboratory experiences, allowing for immediate application of the lecture content and integration into the clinical setting. Students are introduced to the clinical setting through observational and hands-on experiences. Includes a clinical and/or laboratory component. Prerequisite: NURS 521.

NURS 508. Nurse Anesthesia Review Course. 1 Credit.
This course is faculty guided and designed to assist students with their review of nurse anesthesia course and clinical material in preparation for the CCNA certification examination. Prerequisite: Completion of all Nurse Anesthesia Specialization coursework.

NURS 509. Foundations for Nurse Education. 3 Credits.
This course begins to compare and contrast multiple roles and responsibilities of nurse educators in various settings in academic and health service. It will build the conceptual foundation for educational processes with emphasis on ethics, learning theories, taxonomies of learning and current evidence necessary for development of competencies necessary for the practice of educating. Students will begin to formulate their individual philosophy of teaching and learning. Prerequisite: Admission to the Nursing Graduate Program or consent of the instructor. Prerequisite or Corequisite: NURS 500. S.

NURS 510. Adv Physiology/Pathophysiology I. 3 Credits.
Normal physiologic functions associated with cellular structure and environment. Physiologic and pathophysiologic functions of the human body and its organs, both separately and integrated in whole activities. Prerequisite: Admissions to graduate study.

NURS 511. Adv Physiology/Pathophysiology II. 3 Credits.
Physiologic and pathophysiologic functions of the human body and its organ systems, both separately and integrated in whole activities. Prerequisite: NURS 510 or consent of instructor.

NURS 512. DNP Core Concepts I. 2 Credits.
This course is an exploration of the core concepts that support the developing role of the DNP as a practice focused leader and researcher. Prerequisite: Admission to the DNP Program.
NURS 520. Prof Role Dvlpmt/Nurse Ansthsia. 3 Credits.
The focus of this course is on the identification and analysis of the professional components of nurse anesthesia practice, emphasizing role development; management and leadership; medical, ethical, and legal responsibilities; the provision of culturally competent care; and scope of professional practice. Other areas that will be explored include quality improvement, the legislative process, credentialing, professional organizations, conflict resolution, and self-care and stress management for the anesthetist. An in-depth analysis of current trends and issues affecting healthcare and the delivery of anesthesia services are included in the course content. Prerequisites: NURS 521 and NURS 507. Corequisite: NURS 517.

NURS 521. Foundations of Anesthesia Practice. 3 Credits.
This course provides the foundation for nurse anesthesia practice. Lecture and discussion begin with an analysis of the history of anesthesia nursing, professionalism, and standards of care for the anesthetist. Safety in the nurse anesthesia environment will be emphasized. Additional content includes the applied chemical, physical, and biochemical concepts as they relate to anesthesia practice, including the mechanisms of anesthesia, medical mathematics, medical gas systems, laws governing gases, the anesthesia machine, monitoring principles and equipment, airway equipment and basic airway management, and universal precautions. Prerequisite: Admission to the Nurse Anesthesia Specialization.

NURS 522. Advanced Pathophysiology. 3 Credits.
This course presents a system-focused approach to alterations in normal physiological mechanisms that result in pathologic disease processes. Physiological changes are compared and contrasted over the lifespan and developmental cellular physiology, pathogenesis and clinical manifestations commonly observed in altered health states are reviewed. This knowledge serves as the foundation for advanced clinical assessment, decision making and management for the advanced practice nurse. Prerequisite: Admission to graduate study. F,S,SS.

NURS 523. Health Promotion. 3 Credits.
Paradigms in health promotion, health detection, and disease prevention across the lifespan are used in synthesis in theory and evidence-based primary care interventions. Prerequisite: Admission to the Nursing Graduate Program or consent of the instructor. F,S.

NURS 524. Anatomy for Nurse Anesthetists. 1 Credit.
This course builds upon the concepts and fundamentals of Basic Principles of Anesthesia I and II as it relates to the detailed regional anatomy of the human body. A cadaver laboratory experience will be utilized throughout the course to develop the student's understanding of clinical anatomy related to the airway, central nervous system, peripheral nerves, cardiovascular system, and pulmonary system within an anesthetic context. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S.

NURS 525. Applied Multivariable Statistics. 3 Credits.
Principles, assumptions and applications of major multivariable statistical techniques commonly used in nursing and clinical health research. Prerequisite: Graduate level univariate statistics and admission to the Nursing Doctoral Program or consent of the instructor. F.

NURS 526. Ethical, Legal and Health Policy Issues. 3 Credits.
This course emphasizes health policy issues within the context of legal and ethical concepts. Students will examine and debate health policies in current settings. Physiological, psychosocial, and pharmacological interventions are integrated into the holistic care that incorporates age-related, cultural, family, and community variations. An on-campus intensive is required for this course. Prerequisites: NURS 511 and NURS 585. Corequisite: NURS 597. F.

NURS 527. Anesthesia Seminar and Clinical Practicum III. 5 Credits.
This course further builds on the foundations learned in prerequisite courses. Students will incorporate previously learned anatomy, physiology, pathophysiology, and patient management into the care of subspecialty patients and patients with complex co-existing diseases. Advanced anesthesia principles are applied to the OB, pediatric, geriatric, and neuro patient. The pharmacology and anesthesia management of these subspecialty populations and patients with various disease states, such as kidney, musculoskeletal, and endocrine disorders, will be explored. Analysis, integration, and utilization of research to improve clinical practice is emphasized. The lecture content is reinforced with a clinical experience that emphasizes anesthesia care for subspecialty populations. A clinical/laboratory component is included. Prerequisite: NUR 517.

NURS 528. Advanced Principles of Anesthesia Practice I. 4 Credits.
This course builds upon the nurse anesthesia foundations covered previously in the Basic Principles of Anesthesia I and II courses. An evidence based approach to the anesthetic evaluation, planning, and management of diverse and increasingly complex patient populations, such as those with pre-existing respiratory, cardiac, and renal diseases, will be the focus. The hands-on administration of safe, individualized, and comprehensive anesthetic plans of care to both simulated and actual patients will be introduced and emphasized. Low and high fidelity patient simulation will be utilized to continue developing the student's cognitive and psychomotor skills which are essential to perform clinical anesthesia management. A clinical component will allow the student to apply theoretical principles to nurse anesthesia practice and to increase their clinical skills, knowledge, and autonomy. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. SS.

NURS 529. Advanced Principles of Anesthesia Practice II. 6 Credits.
This course builds on the foundations covered in Basic Principles of Anesthesia I and II along with Advanced Principles I including the evaluation, planning, and management of diverse and increasingly complex patient populations. Evidence-based advanced principles of anesthesia care will be investigated in order to construct and implement comprehensive and individualized anesthetic plans of care for the management of subspecialty patients. Obstetrical and pediatric populations, as well as patients with complex co-existing diseases and those undergoing complex surgical procedures will be the focus. Low and high fidelity patient simulation will be utilized to continue developing the student's cognitive and psychomotor skills which are essential to perform clinical anesthesia management. A clinical component will allow the student to apply theoretical principles to nurse anesthesia practice and to increase their clinical skills, knowledge, and autonomy. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. F.

NURS 530. Research Design & Methods in Nursing. 3 Credits.
Prerequisite or corequisite: NURS 500 or consent of instructor.

NURS 531. Adult-Gerontology Illness Management I. 3 Credits.
This is the first of a two-course sequence that focuses on evidenced-based primary care diagnosis and management of common episodic/chronic problems encountered by young adults, adults and older adults and their social network in ambulatory, inpatient, and community settings. Physiological, psychosocial, and pharmacological interventions are integrated into the holistic care that incorporates age-related, cultural, family, and community variations. An on-campus intensive is required for this course. Prerequisites: NURS 511 and NURS 585. Corequisite: NURS 597. F.

NURS 532. Family Centered Advanced Practice Nursing. 3 Credits.
Theoretical and scientific foundations for advanced practice nursing care for the family as-a-unit in health and illness across the lifespan. Prerequisite: Admission to DNP program or consent of instructor. S.

NURS 533. Adult-Gerontology Illness Management II. 3 Credits.
This is the second of a two-course sequence that focuses on evidenced-based primary care diagnosis and management of common episodic/chronic problems encountered by young adults, adults and older adults and their social network in ambulatory, inpatient, and community settings. Physiological, psychosocial, and pharmacological interventions are integrated into the holistic care that incorporates age-related, cultural, family, and community variations. An on-campus intensive is required for this course. Prerequisite: NURS 531. Corequisite: NURS 597. S.

NURS 534. Management of Health Conditions in Primary Care I. 3 Credits.
This is the first of a two-course sequence that focuses on evidenced-based primary care diagnosis and management of common episodic/chronic problems encountered by adults, including young adults, middle aged adults and older adults and their social network in ambulatory, inpatient, and community settings. Physiological, psychosocial, and pharmacological interventions are integrated into the holistic care that incorporates age-related, cultural, family, and community variations. An on-campus intensive is required for this course. Prerequisite: NURS 531. Corequisite: NURS 597. F,S,SS.

NURS 535. Advanced Pharmacology for Primary Care I. 2 Credits.
Pharmacological agents utilized to treat common acute and chronic health problems are explored in depth. The course focus is on advanced nurse practice roles related to prescription, pharmacological, and therapeutic applications of the drugs. Prerequisite: Admission to the Nursing Graduate Program or consent of the instructor. Prerequisite or corequisite: NURS 510. F,S.
NURS 536. Advanced Nurse Educator Practice of Health Promotion. 2 Credits.
This practicum course affords the Nurse Educator student with opportunities to develop advanced skills in teaching-learning practices in the rural health care environments. The student will apply educational theories and best-evidence teaching strategies with a particular emphasis in education related to health promotion strategies. This course will include topics such as the Nurse Educator role to promote health in rural communities, assess health literacy, and develop appropriate patient educational materials. The practicum emphasizes health promotion education to meet diverse needs of rural dwelling patients, families and groups. Prerequisites: NURS 500, NURS 511, NURS 539, and NURS 514. Corequisite: NURS 526, and NURS 569. F.

NURS 537. Graduate Cooperative Education. 1-2 Credits.
The course focus is upon experience in advanced nursing practice integrating theory, research, and advanced practice in a specific area of nursing. Course overview: the purpose of this course is to provide the graduate nursing student with advanced nursing practice as an employee in a health care agency and to evaluate that experience in relation to the educational program. A clinical/ laboratory component is included. Prerequisite: Permission of Graduate Director of Nursing. Repeatable to 9 credits.

NURS 538. Psych Diagnostic Reasoning. 2 Credits.
This course prepares students for advanced therapeutic communication, interviewing, and assessment of people with mental illness across the life span. Skills are developed in differential diagnoses of psychopathology within the scope and standards of advanced psychiatric mental health nursing practice. Clinical application is included. Prerequisite: Acceptance into the PMHNP program or permission of instructor. S.

NURS 539. Advanced Pharmacology for Primary Care II. 2 Credits.
Pharmaceutical agents utilized to treat common acute and chronic health problems are explored in depth. The course focus is on advanced nurse practice roles related to prescription, pharmacological, and therapeutic applications of the drugs. Prerequisite: Admission to nursing graduate program and NURS 535 or consent of instructor. F.S.

NURS 540. Management of Health Conditions in Primary Care II. 3 Credits.
Clinical decision making skills are developed in the diagnosis and management of acute and chronic health conditions throughout the lifespan. Health promotion, health protection, and disease prevention are emphasized. Prerequisite: NURS 534. F.S,SS.

NURS 541. Illness Management - Adult Gerontology I. 3 Credits.
This is the first of a two-course sequence focusing on evidence-based primary care specific to the adult-gerontology population which includes adolescents, young adults and frail, older adults. This course prepares students to provide healthcare services across the adult-gerontology age spectrum from wellness to illness, using scientific knowledge and theoretical foundations to differentiate between normal and abnormal changes in physiological, psychological and sociological development and aging. Students will develop strategies to provide and coordinate interdisciplinary and holistic care that incorporates age-related, cultural, family, and community variations. Prerequisites: NURS 522, NURS 585, and NURS 597 (I). Corequisite: NURS 597 (II). F.S,SS.

NURS 542. Professional Aspects of Nurse Anesthesia Practice. 3 Credits.
This course provides the entry-level nurse anesthesia student with a foundational knowledge of professional aspects related to nurse anesthesia practice. The focus of this course is on historical perspectives, professional role development, anesthesia business practices, and professional wellness. Prerequisite: Admission to the DNP Program - Nurse Anesthesia Track. F.

NURS 543. Illness Management - Adult Gerontology II. 3 Credits.
This is the second of a two-course sequence that focuses on evidence based primary care specific to the adult-gerontology populations which includes adolescents and young adults to frail, older adults. Course work focuses on evidence based acute and chronic care diagnosis and management of common episodic acute and chronic problems encountered by the adult - gerontological population. Physiological, psychosocial, and pharmacological assessments, including changes associated with aging and development across the adolescent - adult continuum are integrated into the formation of differential diagnosis and interventions of clinical problems in collaboration with other care providers. Prerequisites: NURS 541 and NURS 597 (II). Corequisite: NURS 597 (III). F.S,SS.

NURS 544. Pharmacotherapeutics for Primary Care. 2 Credits.
This course will help prepare the advance practice nursing student for prescriptive authority. Topics will focus on decision making regarding the pharmacological management of common acute and chronic illnesses encountered in primary care settings. Pharmacokinetics, pharmacodynamics, adverse drug reactions, and contraindications will be discussed. Ethical and legal principles of writing prescriptions will also be covered. Students will synthesize research findings related to various medications using case study and discussion. Prerequisites: Admission to DNP program (FNP, AGNP tracks), and NURS 505. S.

NURS 545. Care of the Frail Older Adult. 3 Credits.
In this course the advanced practice nursing student will focus on the complex and multifactorial health care needs of frail elders. Students will develop strategies to provide and coordinate interdisciplinary and holistic care of the frail elderly in a variety of settings. Prerequisite: Admission to DNP program or consent of instructor. S.

NURS 546. Advanced PHN I. 4 Credits.
NURS 546 introduces concepts foundational to advanced PHN practice and population health. Corequisite: NURS 547.

NURS 547. Advanced PHN Practicum I. 4 Credits.
The focus of this course is on application of foundational concepts of Advanced PHN practice. Students will conduct a community assessment and identify community problems and strengths. Written and oral communication skills are emphasized. Corequisite: NURS 546.

NURS 548. Advanced PHN II. 3 Credits.
This course focuses on the leadership role of advanced PHN practice. Public health and community-based organizational assessment, program monitoring and evaluation, quality improvement, and management of multiple projects are emphasized. Concepts of leadership in public and community health and collaborative interdisciplinary practice are discussed. Health policy and law and ethics as they relate to public health are explored. In addition, advanced PHN leadership in rural areas and in disaster/emergency preparedness and management are discussed. Prerequisites: NURS 502, NURS 546, and NURS 547. Corequisite: NURS 549.

NURS 549. Advanced PHN Practicum II. 3 Credits.
This course focuses on implementation of advanced PHN interventions. Corequisite: NURS 548.

NURS 550. Global Public Health Issues. 2 Credits.
This course focuses on population health issues at a global level. Differences in population health status between developing and developed countries are explored. Special emphasis is placed on war as a public health issue and the global impact of AIDS.

NURS 552. Role Development of the CNS. 2 Credits.
Students will compare and contrast the various roles of the clinical nurse specialist and evaluate those roles as they relate to their individual area of practice. Concepts of professional development are emphasized. Prerequisite: NURS 502.

NURS 553. Role Development of the NP. 2 Credits.
This course emphasizes professional role development of the nurse practitioner. Students will compare and contrast the various roles of the nurse practitioner and evaluate those roles as they relate to the student's individual planned area of practice. Prerequisite: NURS 502.

NURS 554. Writing for Publication. 2 Credits.
The course is designed to provide students with knowledge and skills necessary to meet the PhD program requirement and milestone of preparing and submitting a manuscript for publication in a peer-reviewed journal. The achievement of this milestone is foundational for scientific inquiry and the development of nurse scientists. Prerequisite: Consent of Instructor or Advisor. S/U grading. F.S,SS.

NURS 555. Grant Submission. 2 Credits.
The course results in the development and submission of a pre-doctoral, federally-funded research grant proposal, or equivalent with advisor approval. The course builds upon previous doctoral coursework covering grantmanship and issues in preparing funded research proposals and grant budgets. Prerequisites: NURS 573 and consent of Instructor or Advisor. F.S,SS.
NURS 556. PhD Student Intensive. 1 Credit.
This course submerges the student into a community of scholars during an annual on-campus intensive experience. The student will participate in a variety of presentations, workshops, and activities which focus on development into the role of a nurse scientist and scholar. The course uses a variety of activities which help the student develop into the role of a nurse scientist and scholar. Prerequisite: Admission to the Nursing PhD program. Repeatable to 5 credits. S/U grading. F.S.

NURS 557. Foundations of Nursing Science. 3 Credits.
The epistemology and philosophy of nursing as an art and a science are examined. Patterns of knowing as well as clinical, conceptual, and empirical types of nursing knowledge will be discussed. The development of theory as a knowledge claim is analyzed. Prerequisites: Masters Level Nursing Theory Course and Admission to PhD Program. S.

NURS 558. Research Design. 3 Credits.
This course prepares the doctoral student to understand the link between research design and the study purpose. Prerequisite: Admission to PhD program or consent of instructor. F.

NURS 559. Maternal and Child Health in Primary Care. 2 Credits.
This course focuses on advanced practice nursing care of obstetric and pediatric clients within a primary care setting. An on-campus intensive is required for this course. Prerequisites: Admission to FNP, NURS 510, NURS 511, NURS 523, and NURS 585. SS.

NURS 560. Clinical Anesthesia Practicum I. 5 Credits.
This is the first of five clinical practicum courses that build upon one another and provides students the opportunity to obtain the clinical experiences necessary to develop increasing proficiency in nurse anesthesia practice. The emphasis of this course is the integration of current evidence and advanced nursing knowledge with decision making and care management for diverse, but less complex, patient populations receiving anesthesia care. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S/U grading. S.

NURS 561. Clinical Anesthesia Practicum II. 3 Credits.
This is the second of five clinical practicum courses designed to provide the student with the opportunity to obtain clinical experiences necessary to develop increasing proficiency in nurse anesthesia practice. The emphasis of this course is the integration of current evidence and advanced nursing knowledge with decision making and care management for the diverse and increasingly more complex patient populations receiving anesthesia care. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S/U grading. SS.

NURS 562. Clinical Anesthesia Practicum III. 4 Credits.
This is the third of five clinical practicum courses that provides the student with the opportunity to obtain clinical experiences necessary to develop increasing proficiency in nurse anesthesia practice. The emphasis of this course is the integration of current evidence and advanced nursing knowledge with decision making and care management for the diverse, increasingly complex, patient populations receiving anesthesia care. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S/U grading. F.

NURS 563. Clinical Anesthesia Practicum IV. 6 Credits.
This is the fourth of five clinical practicum courses that provides the student with the opportunity to obtain clinical experiences necessary to develop increasing proficiency in nurse anesthesia practice. The emphasis of this course is the integration of current evidence and advanced nursing knowledge with decision making and care management for diverse patient populations, of all acuity levels, receiving anesthesia care. Emphasis will also be placed on student autonomy, continuing professional role development, and leadership skills. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S/U grading. F.

NURS 564. Psychopharmacology. 2 Credits.
This course provides the advanced practice student with knowledge in the pharmacology of psychopathology across the life span. Emphasis will be placed on the appropriate use of pharmaceuticals for psychiatric disabilities/disorders including: Mood disorders, development disorders, psychotic disorders, anxiety disorders, dementia, and substance abuse. Prerequisite: Admission to PMHNP program or permission of instructor. S.

NURS 565. Rural Populations and Rural Health. 3 Credits.
This course provides an overview of characteristics of rural populations and rural health. Factors that contribute to health, morbidity, and mortality are examined, and the compounded vulnerability of rurality and disadvantaged groups is analyzed. Prerequisite: A graduate level Epidemiology course or permission of instructor. S.

NURS 566. Curriculum Development. 3 Credits.
This course focuses on the curriculum development process. Societal, professional, and institutional factors as well as current research findings influencing the curriculum development process are analyzed. Consideration of the impact of adult learning principles, workforce issues, legal-ethical concerns, and diverse student populations in regard to the curriculum development process is given. Prerequisite: NURS 509.

NURS 567. Teaching Methodologies. 3 Credits.
The course explores theory-based teaching strategies designed to develop cognitive abilities, psychomotor skills, and affective qualities in learners from diverse backgrounds. Strategies and methods for the teaching of nursing content in a variety of settings are utilized. The use of technological tools in nursing education is evaluated. Prerequisite or corequisite: NURS 566.

NURS 568. Teaching Practicum. 2 Credits.
Students assume the role of the nurse educator in selected learning settings under the guidance of a preceptor. A clinical/laboratory component is included. Prerequisites: NURS 566 and NURS 567 and NURS 569, or consent of instructor.

NURS 569. Assessment and Evaluation. 3 Credits.
Principles of assessment, measurement, and evaluation are analyzed in this course as they relate to nursing education. The processes of assessing student learning, teaching, and program outcomes are explored. Topics relevant to the evaluation of individual student learning such as test development, evaluation of critical thinking, and clinical evaluation are included. The processes of faculty and program evaluation are examined. Prerequisites: NURS 556 and NURS 567, or consent of instructor.

NURS 572. Diverse Vulnerable Populations. 3 Credits.
Students will explore a wide range of concepts as they apply to diverse and vulnerable populations. The focus of the course is on understanding concepts and principles important to nursing when doing research, planning health care, developing health policy, and teaching in this area. Prerequisite: Admission to the Nursing Graduate Program or consent of the instructor.

NURS 573. Research Funding. 3 Credits.
This course integrates the scientific and practical aspects of professional writing and grant proposal development. Prerequisite: Admission to the graduate nursing program or approval of instructor. Prerequisite or Corequisite: NURS 574 and/or NURS 575; Non-nursing programs: Graduate level quantitative and/or qualitative research methods coursework required. F.

NURS 574. Quantitative Nursing Methods. 3 Credits.
The purpose of this course is to acquire knowledge and skills necessary to apply quantitative research methods in nursing. The course includes substantial applications of established methodologies and effective research techniques within the quantitative paradigm. Prerequisite: Admission to the Doctoral Program and completion of a multivariate statistics course. S.

NURS 575. Qualitative Nursing Research. 3 Credits.
This course focuses on examination and analysis of qualitative research designs with particular emphasis on approaches relevant to phenomena in nursing. Students will conduct fieldwork to develop some beginning qualitative research skills. Prerequisite or Corequisite: Admission to Doctoral Program or consent of instructor. F.

NURS 576. Clinical Anesthesia Practicum V. 5 Credits.
This is the final capstone clinical practicum course that provides the student with the opportunity to develop full autonomy and proficiency in nurse anesthesia practice. The emphasis of this course is the integration of current evidence and advanced nursing knowledge with advanced clinical judgement, well developed clinical decision making, and total case management for diverse patient populations receiving anesthesia care. Professionalism and leadership within healthcare systems will be emphasized. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S/U grading. SS.
NURS 577. Rural Healthcare Ethics. 3 Credits.  
This course is directed toward the development of critical dialogue and leadership strategies for dealing with ethical issues related to nursing, health care and research. Commitment to discussion, understanding and acceptance of the rights of others in dilemmas is emphasized. Reflexive nursing, which brings attention to one’s own position and objectivity, is encouraged. The challenges of ethics in rural milieus are included in the discourse. Prerequisite: Admission to the Nursing doctoral Program or consent of the instructor. S.

NURS 578. Doctoral Seminar. 1 Credit.  
Prerequisite: Admission to the Nursing doctoral Program or consent of the instructor.

NURS 580. Research Practicum. 1-6 Credits.  
The doctoral research practicum provides a research experience for doctoral nursing students separate from the dissertation to participate in the research process under the guidance of an experienced-funded investigator. Experiences may include grant writing, data collection, analysis, and manuscript writing. Repeatable to 6 credits. F,S,SS.

NURS 581. The Nurse Scientist. 3 Credits.  
This course prepares the doctoral student to actively engage in doctoral study with knowledge of the discipline of nursing and skills that facilitate success as an emerging nurse scientist. Prerequisite: Admission to PhD program. F.

NURS 583. Individual Therapy. 2 Credits.  
This course provides knowledge and skill development in the implementation of evidence-based clinical therapies and treatments focused on the individual including cultural variations. Includes clinical practice. Prerequisites or corequisites: NURS 500, NURS 502, NURS 510, NURS 511, NURS 514, NURS 523, NURS 535, NURS 538, NURS 539, and NURS 585.

NURS 584. Group and Family Therapies. 3 Credits.  
Evidence-based clinical interventions with diverse groups and families are presented. Opportunities for clinical implementation accompany the theoretical models. A clinical/laboratory component is included. Prerequisites or corequisites: NURS 538, NURS 583 and admission into Psychiatric Mental Health specialization or consent of instructor.

NURS 585. Advanced Health Assessment. 3 Credits.  
An evidenced-based approach will be used to present methodologies for graduate student performance on health histories, developmental assessments, and physical/psychosocial assessments of individuals. Communication and interviewing techniques for advanced nursing practice are applied. A clinical/laboratory component is included with variations for Family Nurse Practitioner, Psych/Mental Health, Adult-Gerontology, and Nurse Anesthesia students. An on-campus intensive is required for this course. Prerequisite: Completion of a prerequisite course in health assessment techniques or consent of instructor. Prerequisite or corequisite: NURS 510. F,S.

NURS 586. Rural Health Programs and Research. 3 Credits.  
This course focuses on policies, programs and research related to rural health. Prerequisite: NURS 565 and NURS 558 or consent of instructor. F.

NURS 588. Management of Psychopathology I. 2 Credits.  
This is the first of a two course sequence that focuses on the management of individuals across the lifespan, groups and families with or affected by psychopathology. Continuity of care across settings and community are emphasized. Prerequisites or Corequisites: NURS 564, NURS 584, and admission to the PMHNPN program.

NURS 589. Management of Psychopathology II. 2 Credits.  
This is the second of a two course sequence that focuses on the management of individuals across the lifespan, groups and families with or affected by psychopathology. Management of co-morbidities is emphasized. Prerequisite or Corequisite: NURS 588. S.

NURS 590. Directed Studies. 1-3 Credits.  
Designed to meet the needs of individual and/or small groups of graduate students. The course content will be based on student interests and needs in conjunction with the faculty member’s area of specialization. Prerequisite: Consent of instructor. Repeatable.

NURS 591. Readings in Nursing. 1-3 Credits.  
Readings in selected nursing/health care topics with written and/or oral reports. Prerequisite: Consent of instructor. Repeatable.

NURS 592. Advanced PHN Practicum III. 4 Credits.  
This course provides a capstone experience in Advanced PHN practice. Students are expected to integrate knowledge from all of their previous coursework into an applied practicum experience in population health, to evaluate population health interventions and programs, and develop strategies for program funding. Prerequisites: NURS 548 and NURS 549.

NURS 593. DNP Internship I. 4 Credits.  
This first DNA Internship course is designed to provide the DNA Advanced Practice Nurse (APN) student with opportunities to apply the concepts in the AACN DNA Essentials document in the practice environment. Students will also begin development of the DNA capstone project. Corequisite: NURS 598.

NURS 594. DNP Internship II. 4 Credits.  
This course is designed to provide the DNP student with additional practice focused learning opportunities to apply the concepts in the AACN DNP Essentials document in the practice environment. The student will complete and disseminate findings from the capstone project. Prerequisite: NURS 593. Corequisite: NURS 599.

NURS 595. DNP Internship III. 4 Credits.  
This course is designed to provide the DNP APN with additional practice focused learning opportunities to apply the concepts in the AACN DNP Essentials document in the practice environment. The student will complete the DNP capstone project and disseminate findings in presentations and publications. Prerequisites: NURS 593 and NURS 594. Corequisite: NURS 596.

NURS 597. Advanced Clinical Practicum. 1-12 Credits.  
This clinical practicum course provides the student with the opportunity to obtain extended clinical experience in the area of specialization. The course focuses on the integration of theoretical knowledge into clinical practice. A clinical/laboratory component is included. Prerequisite: Completion of NURS 517 for Nurse Anesthesia specialization or completion of first year curriculum for the Family Nurse Practitioner, Psychiatric/Mental Health or Gerontology specializations. Repeatable. SU grading.

NURS 600. Integrated DNP Core Concepts I. 3 Credits.  
This course is an exploration of the core concepts that support the varying roles of the DNP prepared APN as a practice focused leader and clinical scholar. Development of practice focused leadership skills in the care of rural and vulnerable populations will also be addressed. Prerequisite: Admission to the DNP Program. F.

NURS 601. Integrated DNP Core Concepts II. 3 Credits.  
This course builds upon content covered in Integrated DNP Core Concepts I. Students continue to explore core concepts that support the varying roles of the role of the DNP prepared APN practice focused leader and clinical scholar. In addition, students will critically examine the historical evolution of epidemiology and epidemiological concepts relevant in advanced nursing practice. Prerequisites: Admission to the DNP Program and NURS 600. S.

NURS 602. Evidence Based Research I. 3 Credits.  
This course focuses on the development of practice scholarship through the use of evidence to address clinical problems and inform future practice. Students in the class will define practice problems, evaluate evidence based methods to address those problems and design practice focused projects to measure outcomes. Middle range theories will also be explored and used as frameworks for study designs. Statistics and previous Evidence Based Practice course is highly recommended. Prerequisite or Corequisite: Admission to the DNP program. F.

NURS 603. Evidence-Based Research II. 3 Credits.  
This course focuses on the continued development of the practice scholar and includes content of research and program evaluation methods and analysis used to address practice problems and inform future evidence based practice. Prerequisite: NURS 602. Corequisite: NURS 609. S.

NURS 604. Health Informatics. 3 Credits.  
This course prepares the health care practice professional to use and evaluate emerging health care technology and data systems to support evidence-based practice. Prerequisite: Admission to DNP Program or consent of instructor. SS.

NURS 605. Health Policy. 2 Credits.  
This course will prepare the health care professional to understand and apply knowledge of health policy to function as an advocate for populations and individuals. Prerequisite: Admission to the DNP Program or consent of instructor. SS.
NURS 606. DNP Systems Focused Practice I. 2 Credits.
This course is designed to provide the DNP student with opportunities to apply the concepts in the AACN DNP Essentials in the practice environment. Prerequisite: NURS 603. SS.

NURS 607. DNP Systems Focused Practice II. 3 Credits.
This course continues to provide the DNP student with opportunities to apply the concepts in the AACN DNP Essentials in the practice environment. Prerequisites: NURS 603 and NURS 606. F.

NURS 608. Healthcare Economics, Finance and Leadership. 3 Credits.
This course focuses on healthcare economics, finance and practice leadership skills related to the role of the DNP prepared advanced practice nurse within the complex health care system. Prerequisite or Corequisite: Admission to the DNP program or consent of instructor. F.

NURS 609. DNP Project Teams. 1-6 Credits.
The student will design, implement and evaluate the DNP project as well as present findings in the applicable practice setting under the guidance of DNP faculty. Prerequisite: NURS 603. Repeatable to 6 credits. F,S,SS.

NURS 610. DNP Capstone. 2 Credits.
The capstone course provides the DNP students with an opportunity to develop skills in reporting and disseminating practice focused research findings. Writing for publication of practice focused research is emphasized. Prerequisite or Corequisite: NURS 609. S,SS.

NURS 611. Rural Healthcare Forum. 1 Credit.
This course focuses on interprofessional healthcare delivery to rural and underserved populations. Prerequisite or Corequisite: Admission to DNP program or consent of instructor. SS.

NURS 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

NURS 997. Independent Study. 1-4 Credits.
Repeatable to 4 credits.

NURS 998. Thesis. 1-4 Credits.
Repeatable to 15 credits.

NURS 999. Dissertation. 1-15 Credits.
Repeatable to 15 credits.

Master of Science in Adult Gerontology Primary Care Nurse Practitioner

Admission Requirements
Approved admission to the Master of Science degree program requires the following of all students:

1. Completion of a baccalaureate degree or higher from an accredited nursing program
2. An undergraduate or graduate statistics course
3. A minimum GPA of at least 3.00 for the last two years of baccalaureate study
   (official transcripts must be submitted)
4. Current U.S. unencumbered RN licensure (upload Nursys verification report in application)
5. Three letters of recommendation
6. Current resume or curriculum vitae
7. Statement of goals
8. One year of experience as a registered nurse preferred – track specific experience desirable
9. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.
10. Interview may be required (via web, phone, or in person)
11. Successful passage of criminal background check and drug screen will be required upon offer of admission
12. Satisfaction of current health and immunization policy of the Department of Nursing will be required upon offer of admission

Degree Requirements
Students seeking the Master of Science degree with a major in Nursing at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the College of Nursing & Professional Disciplines.

1. A minimum of 30 semester credits in a major field.
2. At least one-half of the credits must be at or above the 500-level.
3. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.

Required Courses:
Adult-Gerontology Primary Care Nurse Practitioner
(mostly online courses)

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<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>NURS 500</td>
<td>Theories/Concepts Nursing</td>
<td>3</td>
</tr>
<tr>
<td>NURS 502</td>
<td>Evidence for Practice</td>
<td>3</td>
</tr>
<tr>
<td>NURS 505</td>
<td>Advanced Pharmacology</td>
<td>3</td>
</tr>
<tr>
<td>NURS 522</td>
<td>Advanced Pathophysiology</td>
<td>3</td>
</tr>
<tr>
<td>NURS 523</td>
<td>Health Promotion</td>
<td>3</td>
</tr>
<tr>
<td>NURS 541</td>
<td>Illness Management - Adult Gerontology I</td>
<td>3</td>
</tr>
<tr>
<td>NURS 543</td>
<td>Illness Management - Adult Gerontology II</td>
<td>3</td>
</tr>
<tr>
<td>NURS 544</td>
<td>Pharmacotherapeutics for Primary Care</td>
<td>2</td>
</tr>
<tr>
<td>NURS 545</td>
<td>Care of the Frail Older Adult</td>
<td>3</td>
</tr>
<tr>
<td>NURS 553</td>
<td>Role Development of the NP</td>
<td>2</td>
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<tr>
<td>NURS 585</td>
<td>Advanced Health Assessment</td>
<td>3</td>
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<tr>
<td>NURS 597</td>
<td>Advanced Clinical Practicum (I)</td>
<td>4</td>
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<tr>
<td>NURS 597</td>
<td>Advanced Clinical Practicum (II)</td>
<td>4</td>
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<td>NURS 605</td>
<td>Health Policy</td>
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<tr>
<td>NURS 997</td>
<td>Independent Study</td>
<td>2</td>
</tr>
</tbody>
</table>

Total Credits: 47

Nutrition and Dietetics

M.S. in Nutrition (p. 510)

Accelerated B.S. in Dietetics/M.S. in Nutrition and Dietetics
(http://und-public.coursetime.com/graduateacademicinformation/departmentalcoursesprograms/nutritiondietetics/accel)

Courses

N&D 541. Biochemical and Physiological Basis of Nutrition: Macronutrients. 3 Credits.
Integration of the molecular, cellular, and physiologic aspects of macronutrient and energy metabolism in humans. Dietary energy, carbohydrates, fiber, lipids, proteins, nutritional interactions and metabolic consequences with emphasis on recent advances in macronutrient nutrition are explored. Prerequisites: Undergraduate or graduate biochemistry and physiology. F, even years.

N&D 542. Biochemical and Physiological Basis of Nutrition: Micronutrients. 3 Credits.
Integration of the molecular, cellular, and physiologic aspects of vitamin and mineral metabolism in humans. Functions, biological availability, hormonal regulation, requirements, metabolic consequences of deficiencies or excesses, and interrelations with other nutrients with emphasis on current topics related to vitamins, minerals and phytochemicals. Prerequisites: Undergraduate or graduate biochemistry and physiology. S, odd years.

N&D 543. Advanced Topics in Lifecycle Nutrition. 3 Credits.
The course focuses on current and evolving research relating to the physiological changes and nutritional needs throughout the lifecycle. The course will also explore common nutrition-related conditions at each phase of the lifecycle, with emphasis on nutrition strategies to prevent and manage these conditions. On demand.
N&D 544. Obesity and Eating Disorders. 3 Credits.
The course examines the obesity epidemic, eating disorders, and prevention and treatment approaches at multiple levels: individual, social, environmental, and policy. Obesity, anorexia nervosa, bulimia nervosa, binge eating, and disordered eating will be discussed and evidence-based interventions explored with emphasis on role of the nutritionist as part of an inter-professional care team. Prerequisite: Admission to the program. On demand.

N&D 545. Nutrition in Disease Prevention and Wellness. 3 Credits.
An exploration of prevention and wellness models specifically designed to decrease the mortality and morbidity of chronic disease in the United States population. The course focuses on the involvement of optimal nutritional health in prevention of disease and promotion of wellbeing. Prerequisite: Admission to the program. On demand.

N&D 550. Nutrition Education and Program Planning. 3 Credits.
Theoretical, research and applied aspects of adult nutrition education. Curriculum design models, instructional tools, program planning and evaluation of education interventions will be discussed in the context of chronic disease prevention. Effective teaching strategies and procedural models for designing effective nutrition education programs targeting the general public will be presented. Prerequisite: Permission of Instructor. F, odd years.

N&D 552. Professional Nutrition Precepting. 1 Credit.
This course provides both didactic content and opportunities for nutrition professionals to become effective preceptors of nutrition/dietetics students. Under the direction of faculty, dietitians and nutritionists will precept undergraduates in supervised practice settings. S/U grading. On demand.

N&D 553. Nutritional Health Advocacy and Policy. 3 Credits.
An analysis of U.S. public policy processes in relation to food and nutrition, with emphasis on the role of the nutrition professional in influencing the public policy process and advocating for food policies. 3 graduate credit hours. Prerequisite: Admission to the program. On demand.

N&D 554. Nutrigenomics. 3 Credits.
This course explores the interactions between nutritional factors, genomics, and health. The course also explores the potential roles of the nutrition professional in developing personalized dietary prescriptions to optimize health, reduce disease risk, or improve management of chronic disease. Prerequisites: Undergraduate courses in biochemistry or advanced nutrition and human physiology. On demand.

N&D 555. Small Grant Proposal Development. 1 Credit.
Development of small grant proposals to support nutrition-related program planning and research studies. Prerequisite or Corequisite: ND 551 or N&D 594.

N&D 560. Nutrition Counseling. 3 Credits.
This course develops and strengthens advanced nutrition counseling skills using the evidence-based motivational interviewing style. The focus will be on attending to client-centered orientation and building therapeutic relationships through engaged communication skills. Core theories explored with emphasis on enhancing practical skill development through video demonstrations, real play, case studies, creative reflection, and facilitated group discussions. Prerequisite: Admission into the program. S, even years.

N&D 590. Directed Studies in Nutrition. 1-4 Credits.
Designed to meet the needs of an individual student or a small group of graduate students. Course content will be based on the interest and needs of the student(s) in consultation with the faculty member's area of specialization. Prerequisite: Consent of Instructor. On demand.

N&D 591. Seminar in Nutrition. 1 Credit.
Discussion of current research and evidence-based practice in nutrition. Practice of oral presentation of scientific data in a professional setting. On demand.

N&D 594. Research Methods in Nutrition. 3 Credits.
The course examines the scientific foundation of nutrition research and critiques nutrition research. Students develop a research proposal. Prerequisites: Graduate status and admission into the program. S, even years.

N&D 596. Nutrition Education and Counseling Practicum. 2 Credits.
A block of supervised practice experiences working with diverse populations in a nutrition clinic focusing on the development of advanced nutrition education counseling skills. Students will develop both group and individualized client-centered counseling approaches. Practicum is taken near completion of graduate coursework. Prerequisites: N&D 560, a minimum of 20 credits in graduate program, and declared specialization of nutrition education and counseling. Repeatable to 4 credits. SS, even years.

N&D 598. Dietetics Practicum. 2-4 Credits.
The graduate practicum provides an opportunity for you to advance your skills and experience working with professionals and clients in an assigned area of dietetics. You will be required to utilize critical thinking, clinical inquiry, informatics, and literature to demonstrate problem solving skills in practice. The expected outcomes of the practicum include the development and refinement of competencies required of an entry-level dietitian. The practicum is a culmination of the knowledge, skills and abilities you have developed in your student career in the dietetic program. It is a time of gaining experience, building confidence, and testing your abilities as a future dietitian. Minimum 90 contact hours completed onsite at assigned facility/agency. Prerequisites: Enrollment in the Coordinated Program in Dietetics and School of Graduate Studies; consent of program director. Repeatable to 4 credits. S.

N&D 991. Independent Study. 1-2 Credits.
Designed to meet the needs of an individual student or a small group of graduate students. Course content will be based on the interest and needs of the student(s) in consultation with the faculty member's area of specialization. Prerequisite: Consent of Instructor. On demand.

N&D 997. Thesis. 1-4 Credits.
A scholarly research project written under the mentorship of the student's advisor. Credit is given upon successful meeting of thesis requirements for the master's degree. Prerequisite: Consent of the instructor. Repeatable to 4 credits. On demand.

Undergraduate Courses for Graduate Credit

N&D 350. Medical Nutrition Therapy I. 3 Credits.
An evidence-based study and application of the nutrition care process. This includes nutritional assessment techniques, pathophysiology in disease, and medical nutrition therapy for common medical conditions. Prerequisite: N&D 325 and PPT 301. F.

N&D 450. Medical Nutrition Therapy II. 3 Credits.
An advanced level of evidence-based study and application of the nutrition care process. This includes pathophysiology in disease and medical nutrition therapy for medical conditions and comorbidities. Prerequisites: N&D 350 and N&D 441. F.

Master of Science in Nutrition

Admission Requirements

1. Completion of a bachelor's or higher degree in nutrition, dietetics or closely related field from a regionally accredited college/university.
2. Students must have a grade of "C" or better in undergraduate courses in advanced nutrition or biochemistry, human physiology and statistics.
3. Recency of courses will be evaluated.
4. Meet minimum requirements for admission set by the School of Graduate Studies, including English proficiency requirements.

Degree Requirements

Students seeking the Master of Science in Nutrition degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Department of Nutrition and Dietetics:

1. A minimum of 30 credits, including 16 credits of core requirements, 10-11 credits to complete one of the specializations, and 4 or less credits of electives.
2. A maximum of 9 credit hours required for the degree may be transferred from another institution and must meet the School of Graduate Studies transfer credit requirements.

3. Completion of a week-long, campus-based training in nutrition practice and research skills for students completing the Nutrition Education and Counseling specialization.

4. Successful completion of a comprehensive examination.

**Curriculum**

Core course requirements:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>OT 200</td>
<td>Introduction to Occupational Therapy</td>
<td>2</td>
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Graduate level statistics course

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<th>Course Title</th>
<th>Credits</th>
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<tr>
<td>N&amp;D 511</td>
<td>Biochemical and Physiological Basis of Nutrition:</td>
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<tr>
<td>Macronutrients</td>
<td></td>
<td></td>
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<tr>
<td>N&amp;D 512</td>
<td>Biochemical and Physiological Basis of Nutrition:</td>
<td>3</td>
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<tr>
<td>Micronutrients</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

N&D 550 Nutrition Education and Program Planning   | 3       |

N&D 591 Seminar in Nutrition                        | 1       |

N&D 594 Research Methods in Nutrition               | 3       |

Nutrition Education and Counseling Specialization course requirements:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>N&amp;D 560</td>
<td>Nutrition Counseling</td>
<td>3</td>
</tr>
<tr>
<td>NURS 605</td>
<td>Health Policy</td>
<td>2</td>
</tr>
<tr>
<td>N&amp;D 590</td>
<td>Directed Studies in Nutrition</td>
<td>1</td>
</tr>
<tr>
<td>N&amp;D 596</td>
<td>Nutrition Education and Counseling Practicum</td>
<td>2</td>
</tr>
<tr>
<td>N&amp;D 997</td>
<td>Independent Study</td>
<td>2-4</td>
</tr>
<tr>
<td>or N&amp;D 998</td>
<td>Thesis</td>
<td>2-4</td>
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Electives

<table>
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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>N&amp;D Electives (availability based on instructional resources, student interest, and minimum enrollment)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N&amp;D 543</td>
<td>Advanced Topics in Lifecycle Nutrition</td>
<td>3</td>
</tr>
<tr>
<td>N&amp;D 544</td>
<td>Obesity and Eating Disorders</td>
<td>3</td>
</tr>
<tr>
<td>N&amp;D 545</td>
<td>Nutrition in Disease Prevention and Wellness</td>
<td>3</td>
</tr>
<tr>
<td>N&amp;D 552</td>
<td>Professional Nutrition Precepting</td>
<td>1</td>
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<tr>
<td>N&amp;D 553</td>
<td>Nutritional Health Advocacy and Policy</td>
<td>3</td>
</tr>
<tr>
<td>N&amp;D 554</td>
<td>Nutrigenomics</td>
<td>3</td>
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<tr>
<td>N&amp;D 560</td>
<td>Nutrition Counseling</td>
<td>3</td>
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<tr>
<td>N&amp;D 555</td>
<td>Small Grant Proposal Development</td>
<td>1</td>
</tr>
<tr>
<td>N&amp;D 590</td>
<td>Directed Studies in Nutrition</td>
<td>1-4</td>
</tr>
</tbody>
</table>

Electives can come from any department that has relevant coursework. Courses must be approved by the student's academic advisor and be included on the student’s Program of Study before the course is taken. Graduate level courses taken prior to acceptance as a graduate student at UND may be included in the student's Program of Study with approval.

**Occupational Therapy**

Master of Occupational Therapy (p. 515)

Doctor of Occupational Therapy (p. 513)

OT 200. Introduction to Occupational Therapy. 2 Credits. History, scope, objectives, and functions of Occupational Therapy. F,S.

OT 422. Anatomy Occupational Therapy. 5 Credits. Detailed study of human anatomy, with an emphasis on skeletal muscle, its vasculature, and the peripheral nervous system. The laboratory portion of the course allows for a direct study of the human form through dissection of human cadavers. Prerequisite: Occupational Therapy majors only. S.

OT 423. Fundamentals of Neuroscience for Occupational Therapy. 3 Credits. Survey of the major theories of behavior, cognition, and neurological disorders based on experimental findings in neuroanatomy, neurophysiology, and neurobiology. Laboratory included. Prerequisite: Occupational Therapy majors only. F.

OT 424. Muscle Function in Health and Disease. 4 Credits. The study of musculature acting on the extremities and trunk. Theory and techniques of musculoskeletal evaluation with analysis of normal and pathological human motion. Laboratory included. Prerequisite: Occupational Therapy majors only. S.

OT 425. Occupational Therapy with Infants and Pre-School Children. 4 Credits. Normal and abnormal human development, conception through the pre-school years. Emphasis on reflexes, sensory systems, neurodevelopmental systems, illness and trauma, assessment procedures, treatment techniques, families and intervention teams, and treatment outcomes. Laboratory included. Prerequisite: Occupational Therapy majors only. F.

OT 426. Personal/Professional Development. 1 Credit. Promote self-awareness and interpersonal communication skills including basic listening skills, ability to provide meaningful feedback and appropriate group membership skills. Prerequisite: Occupational Therapy majors only. SS.

OT 427. Orientation to Occupational Therapy Theory. 3 Credits. Orientation to human occupation, occupational performance assessment, theoretical practice models, and core processes in occupational therapy. Prerequisite: Occupational Therapy majors only. F.

OT 428. Quantitative Research Methods-O.T.. 3 Credits. Design and implementation of quantitative research, the evaluation of quantitative research studies, the interpretation of statistics as applied to occupational therapy, and the process of presentation and publication of quantitative research projects. Laboratory included. Prerequisite: Occupational Therapy majors only. F.

OT 429. Occupational Therapy with School Age Children and Young Adults. 4 Credits. Normal and abnormal human development, disease and disability, school age through young adulthood. Emphasis on assessment, intervention planning and program outcomes for individuals with disabilities in a variety of practice settings including school, community, and medicine. Laboratory included. Prerequisite: Occupational Therapy majors only. S.

OT 430. Psychosocial Aspects of Occupational Therapy for Children, Adolescents and Young Adults. 4 Credits. Psychosocial development and interruptions to development in children, adolescents, and young adults, with emphasis on OT evaluation, treatment planning and implementation, and treatment outcomes. Laboratory included. Prerequisite: Occupational Therapy majors only. S.

OT 431. Medical Science I. 2 Credits. First in a two-semester sequence of courses, which covers human body systems and disease and disability groups discussed from all aspects of comprehensive rehabilitation. Included are chronic illness, neurological and orthopedic conditions, general medicine and surgery, and sensory disabilities across the lifespan. Prerequisite: Occupational Therapy majors only. F.

OT 432. Medical Science II. 3 Credits. Second in a two-semester sequence of courses, which covers human body systems and disease and disability groups discussed from all aspects of comprehensive rehabilitation. Included are chronic illness, neurological and orthopedic conditions, general medicine and surgery, and sensory disabilities across the lifespan. Integration included. Prerequisite: Occupational Therapy majors only. S.

OT 433. Group Leadership Skills in Occupational Therapy. 2 Credits. Didactic and experiential learning in a small group setting. Provides students with opportunities to function as group facilitators in a variety of practice settings. Prerequisite: Occupational Therapy majors only. S.
OT 438. Practicum: Children/Adolescents. 1 Credit. Observation and experience in a university-approved pediatric and/or adolescent facility; supervised by occupational therapists, educators, and allied health professionals. Prerequisite: Occupational Therapy majors only. S/U grading. S.

OT 451. Multicultural Competency in Occupational Therapy. 3 Credits. Develop an understanding of and an appreciation for social-cultural and ethnic diversity and use that understanding to address issues, solve problems, and shape civic, personal, and professional behaviors. To recognize that diversity is intimately tied to the concepts of culture, race, language, identity and inter-group dynamics, as well as its applications to complex situations. These concepts are presented within the context of providing OT services. Prerequisite: Occupational Therapy majors only. S.

OT 452. Assistive Technology I. 3 Credits. Introductory study of assistive technology devices and products, assessment, and application methods. Focuses on adaptations, modifications, and technology systems and services that assist individuals with disabilities in greater independence and accessibility across the lifespan. Laboratory included. Prerequisite: Occupational Therapy majors only. F,S.

OT 453. Physical Aspects of OT with the Maturing Adult. 5 Credits. Study of the OT process as applied to physical dysfunction of the maturing adult. Emphasis is on OT evaluation, planning, implementation of treatment, and treatment outcomes. Laboratory included. Prerequisite: Occupational Therapy majors only. F,S.

OT 454. Gerontic Occupational Therapy. 2 Credits. Occupational perspectives of the elderly, including age-related changes, assessment and intervention strategies and the role of occupational therapy in prevention and wellness programs. Laboratory included. Prerequisite: Occupational Therapy majors only. F,S.

OT 456. Psychosocial Aspects of OT with the Maturing Adult. 4 Credits. Psychosocial development and interruptions to development in the maturing adult with emphasis on OT evaluation, treatment planning and implementation, and treatment outcomes. Laboratory included. Prerequisite: Occupational Therapy majors only. F,S.

OT 458. Qualitative Research Methods for Occupational Therapy. 3 Credits. Design and implementation of qualitative research, evaluation of qualitative research studies, analysis and interpretation of qualitative data, and the process of publication and presentation of qualitative research projects. Laboratory included. Prerequisite: Occupational Therapy majors only. F.

OT 460. Introduction to Management and Leadership. 2 Credits. Introduction to the management practices necessary to direct a quality health service and provide the knowledge and skills needed for entry-level leadership positions in OT practice. Focus is on clinical reasoning and critical analysis in administrative and management functions. Laboratory included. Prerequisite: Occupational Therapy majors only. F.

OT 461. Management in the U.S. Healthcare System. 2 Credits. Provide an overview of health services system in the US and current trends and issues facing OT within this system. Content includes: federal and state roles, reimbursement of health care services, regulation, community services, health service providers, consultative, non-traditional areas of practice, service delivery models, legalities, and health policy advocacy. Prerequisite: Occupational Therapy majors only. F.

OT 462. Physical Dysfunction Seminar and Practicum Integration. 3 Credits. The student begins to integrate and synthesize the theoretical knowledge of physical function/dysfunction with clinical practice. It requires the application of foundational knowledge, tools and the theory of practice inherent in the role of an OT. Occupational therapy experiences in facilities, supervised by registered occupational therapists, qualified health professionals and university faculty. Prerequisites: OT 422, OT 423, OT 424, OT 425, OT 426, OT 427, OT 428, OT 429, OT 430, OT 431, OT 432, OT 433 and OT 438. F,S.

OT 463. Psychosocial Dysfunction Seminar and Practicum Integration. 3 Credits. Integration and synthesizing of theoretical knowledge with clinical experience toward the application of therapeutic use of self, self-evaluation, and communication skills in professional development. Occupational therapy experiences in mental health field facilities, supervised by registered occupational therapists, qualified health professionals and university faculty. Prerequisites: OT 422, OT 423, OT 424, OT 425, OT 426, OT 427, OT 428, OT 429, OT 430, OT 431, OT 432, OT 433 and OT 438. F,S.

OT 469. Interprofessional Health Care. 1 Credit. A process-learning course intended to provide experience in building a team of health professionals from different professions. The focus is on learning to work effectively with an interprofessional health care team. Emphasis is placed on effective teamwork, the unique contributions of different professions, patient or family centered approach in health care delivery, and awareness of potential medical errors. S/U grading. F,S.

OT 480. Introduction to Scholarly Writing in Occupational Therapy. 1 Credit. This course is designed to provide students with an understanding of the expectations and mechanics of scholarly writing. It is the first step for the development of a scholarly paper that is a requirement of the MOT program. The course outcome is the development of a proposal in an area of interest to the student(s) which has been approved and supervised by a faculty advisor to meet the first requirement of OT 995 Scholarly Project in OT or OT 997 Independent Study. Course content includes the mechanics of writing, development, content and format of the scholarly paper; the use of appropriate resources; and a review of how to use the Publication Manual of the American Psychological Association and the OT department’s graduate student manuals. S.

OT 488. Elective Fieldwork in Occupational Therapy. 3-18 Credits. Application of occupational therapy in evaluation and treatment in optional areas of student special interest in selected fieldwork facilities. Variable credits, repeatable, with maximal total of 18 credits. Prerequisite: Occupational Therapy majors only. Repeatable to 18 credits. S/U grading. F,S,SS.

OT 489. Independent Projects. 1-3 Credits. Individual study and/or research in a particular area of interest for the students with approval of a supervising faculty member. Elective for OT majors. Prerequisite: Occupational Therapy majors only. Repeatable to 12 credits.

OT 490. Occupational Therapy Seminar. 1 Credit. Foundational knowledge relevant to the preparation of an independent study proposal. Serves as the basis for OT 494: Directed Study in Occupational Therapy. Prerequisite: Occupational Therapy majors only. S/U grading. F.

OT 493. Workshop. 1-12 Credits. A workshop course with topics dictated by faculty and student interests primarily for but not confined to continuing education. Prerequisite: Occupational Therapy majors only. Repeatable to 12 credits. S/U grading. On demand.

OT 494. Directed Study in Occupational Therapy. 1 Credit. Development of a proposal in an area of interest to the student approved and supervised by faculty. Serves as the basis for OT 997: Independent Study or OT 995: Scholarly Project in OT. Prerequisite: Occupational Therapy majors only. S/U grading. S.

OT 496. Community Experience. 1-4 Credits. Student initiates and participates in off-campus professional learning activities related to OT under joint faculty and on-site professional supervision. Prerequisite: Permission of Department. Repeatable to 12 credits. S/U grading. F,S,SS.

OT 497. Cooperative Education. 1-6 Credits. Qualified students are employed by selected facilities to further understanding of occupational therapy and health-related service provision. Prerequisite: Occupational Therapy majors only. Repeatable to 12 credits. S/U grading. F,S,SS.

OT 504. Occupation and Vocation. 3 Credits. Application of assessment and problem-solving skills necessary for remediation/rehabilitation of occupational performance deficits in the work realm. Laboratory included. Prerequisite: Occupational Therapy majors only. F,S.

OT 507. Innovative Management and Leadership. 3 Credits. Develop and demonstrate an understanding of the skills necessary to plan, implement and evaluate programs and material for education, consultation and private practice. Prerequisite: Occupational Therapy majors only. F,S.

OT 508. Therapeutic Procedures and Modalities in Occupational Therapy. 2 Credits. Occupational therapy theory and application of specific neuromuscular techniques and modalities to promote musculoskeletal function. Laboratory included. Prerequisite: Occupational Therapy majors only. F,S.
OT 509. Principles of Education in Occupational Therapy. 3 Credits.
Explores the methods and strategies used to develop, implement and evaluate education programs for students in academic and clinical settings, for patients/clients, businesses and professional staff. Information and discussion focus on the theory and research relevant to education in a variety of settings. Prerequisite: Occupational Therapy majors only. F,S.

OT 515. Integration of Occupational Therapy Theory. 3 Credits.
Analysis and applications of theoretical perspectives to occupational therapy process with individuals, groups, and service delivery systems. Prerequisite: Occupational Therapy majors only. F.S.

OT 582. Graduate Practicum. 1-3 Credits.
Supervised experience in a variety of OT practice settings. Students are afforded the opportunity to gain practical, on-the-job experience working in an area that matches the focus of their graduate study. Students will be supervised by on-site personnel. Prerequisite: Occupational Therapy majors only. Repeatable to 12 credits. S/U grading. F,S,SS.

OT 585. Fieldwork in Psychosocial Dysfunction. 9 Credits.
Application of occupational therapy in evaluation and treatment in psychosocial dysfunction fieldwork facilities. Three months full-time. Prerequisite: Occupational Therapy majors only. S/U grading. F,S,SS.

OT 587. Fieldwork in Physical Dysfunction. 9 Credits.
Application of occupational therapy in evaluation and treatment in physical dysfunction fieldwork facilities. Three months full-time. Prerequisite: Occupational Therapy majors only. S/U grading.

OT 589. Readings in Occupational Therapy. 1-2 Credits.
Selected readings in the student’s area of interest with oral and/or written reports. Prerequisite: Occupational Therapy majors only. Repeatable to 6 credits. F,S,SS.

OT 593. Teaching Experience in Occupational Therapy. 1-3 Credits.
Supervised experience in higher education teaching in OT. Projects in course/curriculum development, writing course objectives, writing and delivering lectures and learning activities, and developing assessment tools for the classroom. Prerequisite: Occupational Therapy majors only. Repeatable to 12 credits. F,S,SS.

OT 599. Special Topics in Occupational Therapy. 1-2 Credits.
A series of lectures, discussions, and/or laboratory experiences developed around one or more specific topics in occupational therapy. Prerequisite: Occupational Therapy majors only. Repeatable to 6 credits. F,S,SS.

OT 995. Scholarly Project in Occupational Therapy. 2 Credits.
A collaborative investigation of a relevant professional topic and production of a scholarly report with approval of the major faculty. Prerequisite: Occupational Therapy majors only. F,S,SS.

OT 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

OT 997. Independent Study. 2 Credits.
Independent investigation of a relevant professional topic and production of an independent scholarly report with approval of the major faculty advisor. Prerequisite: Occupational Therapy majors only. F,S,SS.

**Doctor of Occupational Therapy**

**The OTD degree will be offered beginning Fall 2019.**

The Occupational Therapy Department offers a 3-year entry level Occupational Therapy Doctorate (OTD) degree. Occupational therapy is a profession that believes occupation, and especially occupational participation have the power to impact humans’ state of personal health. UND has two campuses offering the entry level Occupational Therapy Doctorate. The main campus is located in Grand Forks, ND, and the satellite is located in Casper, WY. For information regarding the program, the website is http://www.med.und.edu/occupational-therapy/

The Occupational Therapy Program has applied for Candidacy status through the Accreditation Council for Occupational Therapy Education (ACOTE). For information regarding accreditation, contact ACOTE at (301) 652-AOTA, or ACOTE at 4720 Montgomery Lane, Suite 200, Bethesda, MD 20814-3449. The web address is www.acoteonline.org (http://www.acoteonline.org). The national entry-level certification examination for occupational therapists is administered by the National Board for Certification in Occupational Therapy, Inc. (NBCOT, 800 South Frederick Avenue, Suite 200, Gaithersburg, MD 20877-4150, phone 301-990-7979 or http://www.nbcot.org/). Once accreditation has been granted, graduates of the program will be eligible to sit for the National Certification Examination for the Occupational Therapists, administered by NBCOT. After successful completion of this exam, the graduate will be an occupational therapist, registered (OTR). In addition, most states require licensure to practice; however, state licenses are usually based on the results of the NBCOT Certification Examination. A felony conviction may affect a graduate’s ability to sit for the NBCOT Certification Examination or attain state licensure.

Details pertaining to admission requirements, degree requirements and courses offered can be found in the Degree section.

**Mission Statement**

The Department of Occupational Therapy shares the mission of the University of North Dakota and the School of Medicine and Health Sciences to serve the public through: 1) teaching and preparation of highly skilled entry-level occupational therapists, 2) scholarly and creative activity, and 3) service. The mission is accomplished through integration of scholarly inquiry and application of occupation in teaching/learning and OT practice contexts. Best practices in the profession will reflect the exemplars of client-centeredness, occupation-centered, evidence-based, and culturally relevant practice. The skills for lifelong learning and ethical and effective leadership will be promoted to enhance the quality of life of all people with whom we engage.

**Program Goals:**

**Art and Science of Occupational Therapy**

- The student will utilize professional reasoning strategies to provide rationale for decisions made during the occupational therapy process.
- The student will demonstrate ability to accurately implement the OT process in all potential practice areas including evaluation, intervention, and outcomes.
- The student will develop and maintain a therapeutic relationship with clients in order to collaborate during the OT process that would benefit the client’s health and well-being.
- The student will act as a research user in planning and modifying intervention in light of evidence.
- The student will design, construct, and implement the process for building evidence to act as a research builder.

**Professional Identity and Collaboration**

- The student will analyze and articulate the role of occupation and its influence on health and wellness in the examination of the occupational nature of humans.
- The student will articulate an understanding of the history, values, and ethics of occupational therapy and advocate with confidence what occupational therapy can offer society.
- The student will apply occupational based theories and models of practice in order to construct, modify, and evaluate occupational performance related to the OT process.
- The student will actively participate in profession-specific and formal educational activities in a variety of contexts that enhance the role and awareness of occupational therapy demonstrating professional engagement.
- The student will apply skills necessary to effectively take part in intra/interprofessional collaborative practice.

**Innovative and Intentional Leadership**

- The student will evaluate factors influencing public policy and create a course of action for improving access to occupational therapy services.
- The student will make use of management skills to create occupational therapy services for individuals and organizations.
- The student will utilize leadership skills and strategies in preparation for innovative practice.

**Diversity and Inclusive Participation**
• The student will develop and practice relevant and culturally sensitive strategies and skills when interacting with consumers across occupational therapy practice to demonstrate cultural competence.

• The student will analyze the effects of health disparities and inequalities and will advocate to increase occupational engagement for all occupational beings to promote justice.

Admission Requirements

Pre-Occupational Therapy

Prior to admission, a minimum of 90 semester hours of credit from an approved college or university is required. Students should be broadly educated in the sciences and humanities. The CLEP in natural sciences will not meet the Biology and Chemistry requirements in Occupational Therapy. Students should carefully check all CLEP exams for potential acceptance at UND. A student must have achieved a minimum of a letter grade of C in all pre-requisite courses. The prospective student should include eight (8) credits from upper level courses, i.e., 300 and/or 400 numbers. Students may take additional electives from any field of study.

The following list of courses and credits indicates the core prerequisites all applicants must complete prior to admission to the occupational therapy program.

• Two semesters of Composition (6 credits)
• One semester of Public Speaking (3 credits)
• One semester of Biology and lab (4 credits)
• One semester of Chemistry and lab (4 credits)
• One semester of College Algebra (3 credits)
• One semester of Psychology or Sociology Statistics (3 credits)
• One semester of Developmental Psychology (4 credits)
• One semester of Abnormal Psychology (3 credits)
• One semester of Sociology (3 credits)
• One semester of Human Physiology (4 credits)
• One semester of Human Anatomy and laboratory (5 credits)
• One semester of Introduction to Occupational Therapy (2 credits)
• Essential Studies requirements

All of the prerequisite coursework must be completed before entering the professional program; however, the prospective student may be enrolled in pre-professional coursework at the time of application.

Occupational Therapy Doctorate

Early Entry Option: This option grants the student permission to start occupational therapy coursework in the 4th year of study after the completion of 90 credits including all pre-requisites. Students are not officially accepted to the OTD program until they have received their bachelor’s degree. Upon successful completion of the undergraduate degree and occupational therapy coursework-under-permission status, students following this track will be granted official acceptance into the OTD program. Students who do not successfully complete the first year occupational therapy coursework will not be admitted to the program and will not be allowed to take additional occupational therapy courses.

Admission to the professional program in occupational therapy is on a competitive basis with consideration given to pre-professional performance in the sciences, general graduation requirements, leadership potential, volunteer work and personal qualifications. Each application is thoroughly reviewed. This review includes the applicant’s academic record (must have a minimum overall GPA of 2.75 based on a 4 point scale or a GPA of at least 3.0 on the last 60 credits earned), pattern of withdrawals, incompletes, etc., elective coursework, volunteer and/or work experience, references, essay and a personal interview. Applicants are required to complete 60 hours of observation with a professional occupational therapy supervisor and hours should be distributed among psychosocial, physical dysfunction, and pediatric practice. Please refer to http://www.med.und.edu/occupational-therapy/ for more information about admission.

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

Bachelor of General Studies Degree with Health Studies Option

The Bachelor of General Studies Degree with Health Studies Option will be available to occupational therapy students who:

1. Have completed their pre-OT work either at UND or at another institution, and have not earned a previous baccalaureate degree.
2. Have successfully completed the first two semesters of the OT professional sequence. The BGS degree would normally then be awarded at the end of the second semester, if the student has completed all general UND university graduation requirements, including:
   • 120 total credits,
   • A minimum of 30 from UND,
   • 36 credits upper-level credits,
   • All essential studies requirements met (http://und.edu/academics/essential-studies/).

Plan of Study Grid

Professional Year 1

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>OT 400 Culture &amp; Occupation</td>
<td>3</td>
</tr>
<tr>
<td>OT 401 OT Process &amp; Practice Contexts</td>
<td>2</td>
</tr>
<tr>
<td>OT 404 Occupation &amp; Analysis</td>
<td>4</td>
</tr>
<tr>
<td>OT 402 Research Foundations in OT</td>
<td>3</td>
</tr>
<tr>
<td>OT 405 Forming Your Professional Identity</td>
<td>2</td>
</tr>
<tr>
<td>OT 406 Integration &amp; Fieldwork 1</td>
<td>3</td>
</tr>
<tr>
<td>Total Credits</td>
<td>17</td>
</tr>
</tbody>
</table>

Professional Year 2

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>OT 500 Interventions for Mental Functions Applied to Occupational Performance</td>
<td>5</td>
</tr>
<tr>
<td>OT 501 Interventions for Neuromusculoskeletal &amp; Movement Functions Applied to Occupational Performance</td>
<td>5</td>
</tr>
<tr>
<td>OT 502 Management &amp; Advocacy for OT Practice</td>
<td>3</td>
</tr>
</tbody>
</table>

OTD 503 Management & Advocacy for OT Practice
Degree Requirements

1. Students must be formally accepted into the professional education component of the OTD. Acceptance by the UND Office of Admissions or the School for Graduate Studies does not constitute acceptance into the professional program in Occupational Therapy.

2. The professional education component of the OTD will require three academic years (8 consecutive semesters) following completion of the pre-occupational therapy entrance requirements.

3. No student will be allowed to remain in the program or complete fieldwork unless he/she attains a letter grade of at least "C" in all courses.

4. To advance to candidacy in the Graduate School, the student must successfully complete the first year courses and maintain a cumulative School of Graduate Studies GPA of >3.00 AND/OR a summer session GPA of >3.00. Students who fail to advance to candidacy during the first year will be dismissed from the professional program.

5. After advancement to candidacy, the student is expected to maintain a cumulative GPA of >3.00. The School of Graduate Studies will monitor the cumulative GPA, which must be >3.00. If the cumulative GPA is not >3.00, the School of Graduate Studies policies for probation and dismissal for GPA will govern the student’s status.

6. Students in the professional program should be aware of special requirements for fieldwork, professional liability insurance, medical insurance, immunizations, CPR certification, and completion of a criminal background check. These requirements must be met prior to any fieldwork contact with clients. The student will also be responsible for travel, housing, and food costs in addition to the payment of tuition and fees during the full-time fieldwork and experiential experiences. The majority of these experiences will be completed at a geographical location other than the city of Grand Forks or Casper.

7. Prospective students should be aware that a felony conviction may affect a graduate’s ability to obtain a professional license to practice occupational therapy.

8. The faculty reserve the right to place a student on professional probation or to cancel the registration of any student in Occupational Therapy whose performance in the classroom or clinic is unsatisfactory.

9. Students in the occupational therapy program take courses primarily on campus; but while completing level II fieldwork and the Doctoral Experiential Placement will engage in some online learning which requires a computer and internet access.

Master of Occupational Therapy

Admission Requirements

Pre-Occupational Therapy

The Occupational Therapy Department offers a five-year entry level Master of Occupational Therapy (MOT) Degree. Occupational Therapy as a profession is based on the belief that occupation, including its interpersonal and environmental components, may be used to prevent and mediate dysfunction and elicit maximum adaptation. UND has two campuses offering the Master’s of Occupational Therapy degree. The main campus is located in Grand Forks, ND, and the satellite is located in Casper, WY. For information regarding the program, the website is: http://www.ot.und.edu

The Occupational Therapy Program is accredited by the Accreditation Council for Occupational Therapy Education (ACOTE). For information regarding accreditation, contact ACOTE at (301) 652-2682, or ACOTE, c/o Accreditation Department, 4720 Montgomery Lane, Suite 200, Bethesda, MD, 20814-3449. The website is www.acoteonline.org (http://www.acoteonline.org). All basic professional programs must comply with the Standards for an Accredited Educational Program for the Occupational Therapist, 2011. Graduates of the program will be able to sit for the national entry-level certification examination for the occupational therapist administered by the National Board for Certification in Occupational Therapy, Inc. (NBCOT, 12 South Summit Avenue, Suite 100, Gaithersburg, MD 20877; phone 301-990-7979). After successful completion of this examination, the graduate will be an Occupational Therapist Registered (OTR). Most states require licensure in order to practice; state licenses may be based on the results of the NBCOT certification examination. A felony conviction may affect a graduate’s ability to sit for the NBCOT Certification Examination or attain State Licensure.

A pre-OT student typically spends the first two years as a pre-major at the University of North Dakota to complete the program prerequisites. In the beginning of the sophomore year when the student is completing the required courses as listed below, he/she must make written application for admission to the professional occupational therapy program. The CLEP in natural sciences will not meet the Biology and Chemistry requirements in Occupational Therapy. Students should carefully check all CLEP exams for potential acceptance at UND. A student must have at least a C in all prerequisite courses. The student must also obtain a minimum of a C in all professional level courses.

The following courses are required to be taken prior to professional program:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 110</td>
<td>College Composition I</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 130</td>
<td>Composition II: Writing for Public Audiences</td>
<td>3</td>
</tr>
<tr>
<td>COMM 110</td>
<td>Fundamentals of Public Speaking</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 150</td>
<td>General Biology I &amp; 150L</td>
<td>4</td>
</tr>
<tr>
<td>or BIOL 151</td>
<td>General Biology II &amp; 151L</td>
<td>4</td>
</tr>
<tr>
<td>&amp; 150L</td>
<td>and General Biology I Laboratory</td>
<td></td>
</tr>
<tr>
<td>&amp; 151L</td>
<td>and General Biology II Laboratory</td>
<td></td>
</tr>
</tbody>
</table>

Total Program Credits: Minimum of 124
Admission Requirements

Professional Program

Admission to the professional program in occupational therapy is on a competitive basis with consideration given to pre-professional performance in the sciences, general graduation requirements, leadership potential, volunteer work and personal qualifications. Each application is thoroughly reviewed. This review includes the applicant’s academic record (must have minimum overall GPA of 2.75 based on a 4 point scale), pattern of withdrawals, incompletes, etc., elective coursework, volunteer and/or work experience, references, essay and a personal interview.

A prerequisite for admission to the UND Professional Program at the Year I level will be 60 hours of observation and 45 of those hours must be with a professional occupational therapy supervisor and should be distributed over the three required areas (Psychosocial, Physical Dysfunction, Pediatric).

Year III Professional Program

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog. Admission to the School of Graduate Studies requires:

1. Acceptance into the Professional Occupational Therapy program.
2. Successful completion of OT Professional Year I and II.
3. Completion of the School of Graduate Studies application forms.
4. Overall GPA of 2.75 or a 3.0 in both junior and senior years.
5. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.
6. Letter of endorsement from the Chair or Graduate Director of the Department that assures automatic advancement in status from the undergraduate program to the graduate program. The letter of endorsement will be written for students in good academic and professional standing in the program.

It is important to be aware that a felony conviction may affect a graduate’s ability to sit for the National Board for Certification in Occupational Therapy (NBCOT) certification examination or to attain state licensure as an Occupational Therapist. You will be asked to respond to the following questions when registering for the NBCOT exam:

- Have you ever been charged with or convicted of a felony?
- Have you ever had any professional license, registration or certification revoked, suspended or subject to probationary conditions by a regulatory authority or certification board?
- Have you ever been found by any court, administrative or disciplinary proceeding to have committed negligence, malpractice, recklessness, or willful or intentional misconduct, which resulted in harm to another?

Information regarding NBCOT’s process of screening applicants for Character Endorsement may be found at: [http://www.nbcot.org](http://www.nbcot.org). If you have any questions, the department will assist you in this process.

Many fieldwork facilities are requiring proof of immunizations, drug testing, fingerprints, and/or criminal background checks. It is the responsibility of the student to check the fieldwork information and to pay the cost for each process.

### Degree Requirements

**Bachelor of General Studies Degree with Health Studies Option**

The Bachelor of General Studies Degree with Health Studies Option will be available to occupational therapy students who:

1. Have completed their pre-OT work either at UND or at another institution, and have not earned a previous baccalaureate degree.
2. Have successfully completed the first two years of the OT professional sequence. The BGS degree would normally then be awarded at the end of Professional Year Two, prior to beginning the Graduate School career, if the student has completed all general UND university graduation requirements, including:
   1. 120 total credits,
   2. A minimum of 30 from UND,
   3. 36 credits upper-level credits,
   4. All essential studies requirements met (http://und.edu/academics/essential-studies/).

Students seeking the Master of Occupational Therapy degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Occupational Therapy Department.

To maintain graduate student status, the professional level Year III student is required to maintain a GPA of at least 3.0 for all work completed in Year III. Students who were previously on academic or professional probation will be dismissed from the School of Graduate Studies if placed on one additional probation within the professional program.

### M.O.T Curriculum Sequence

**PLAN OF STUDY GRID**

**Professional Year 1**

<table>
<thead>
<tr>
<th>Semester</th>
<th>Courses</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summer</td>
<td>OT 422 Anatomy Occupational Therapy</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>OT 426 Personal/Professional Development</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td><strong>Credits</strong></td>
<td><strong>6</strong></td>
</tr>
<tr>
<td>Fall</td>
<td>OT 423 Fundamentals of Neuroscience for OT</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>OT 425 Occupational Therapy with Infants Pre-School Children</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td><strong>Credits</strong></td>
<td><strong>8</strong></td>
</tr>
<tr>
<td>Spring</td>
<td>OT 427 Orientation to Occupational Therapy</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>OT 428 Quantitative Research Methods-O.T.</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>OT 431 Medical Science I</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td><strong>Credits</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

| Summer   | OT 424 Muscle Function in Health and Disease | 4       |

### Required Courses

- **Pre-Requisites:**
  - OT 200 Introduction to Occupational Therapy
  - Arts and Humanities Electives
  - Other:
    - College Algebra
    - General Chemistry I
    - Psychology
    - Anatomy
    - Human Physiology
    - Social Science Electives
    - Other electives as needed

### Minimum Credits

- **Total Credits:** 57-56
- **Arts and Humanities Electives:**
  - Required:
    - College Algebra
    - General Chemistry I
    - Psychology
    - Anatomy
    - Human Physiology
    - Social Science Electives
    - Other electives as needed
- **Minimum Credits:**
  - Arts and Humanities Electives: 9

**Additional Requirements:**

- **Overall GPA:** 2.75 or 3.0 in both junior and senior years.
- **Fieldwork Information:**
  - Many fieldwork facilities are requiring proof of immunizations, drug testing, fingerprints, and/or criminal background checks. It is the responsibility of the student to check the fieldwork information and to pay the cost for each process.

**Global Diversity Requirement:**

- You must have fulfilled the global diversity requirement.
- More information can be found at: [http://www.und.edu/dept/Registrar/EssentialStudies/esindex.html](http://www.und.edu/dept/Registrar/EssentialStudies/esindex.html).

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**Master of Occupational Therapy**

**Admission Requirements**

**Professional Program**

Admission to the professional program in occupational therapy is on a competitive basis with consideration given to pre-professional performance in the sciences, general graduation requirements, leadership potential, volunteer work and personal qualifications. Each application is thoroughly reviewed. This review includes the applicant’s academic record (must have minimum overall GPA of 2.75 based on a 4 point scale), pattern of withdrawals, incompletes, etc., elective coursework, volunteer and/or work experience, references, essay and a personal interview.

A prerequisite for admission to the UND Professional Program at the Year I level will be 60 hours of observation and 45 of those hours must be with a professional occupational therapy supervisor and should be distributed over the three required areas (Psychosocial, Physical Dysfunction, Pediatric).

Year III Professional Program

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog. Admission to the School of Graduate Studies requires:

1. Acceptance into the Professional Occupational Therapy program.
2. Successful completion of OT Professional Year I and II.
3. Completion of the School of Graduate Studies application forms.
4. Overall GPA of 2.75 or a 3.0 in both junior and senior years.
5. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.
6. Letter of endorsement from the Chair or Graduate Director of the Department that assures automatic advancement in status from the undergraduate program to the graduate program. The letter of endorsement will be written for students in good academic and professional standing in the program.

It is important to be aware that a felony conviction may affect a graduate’s ability to sit for the National Board for Certification in Occupational Therapy (NBCOT) certification examination or to attain state licensure as an Occupational Therapist. You will be asked to respond to the following questions when registering for the NBCOT exam:

- Have you ever been charged with or convicted of a felony?
- Have you ever had any professional license, registration or certification revoked, suspended or subject to probationary conditions by a regulatory authority or certification board?
- Have you ever been found by any court, administrative or disciplinary proceeding to have committed negligence, malpractice, recklessness, or willful or intentional misconduct, which resulted in harm to another?

Information regarding NBCOT’s process of screening applicants for Character Endorsement may be found at: [http://www.nbcot.org](http://www.nbcot.org). If you have any questions, the department will assist you in this process.

Many fieldwork facilities are requiring proof of immunizations, drug testing, fingerprints, and/or criminal background checks. It is the responsibility of the student to check the fieldwork information and to pay the cost for each process.

### Degree Requirements

**Bachelor of General Studies Degree with Health Studies Option**

The Bachelor of General Studies Degree with Health Studies Option will be available to occupational therapy students who:

1. Have completed their pre-OT work either at UND or at another institution, and have not earned a previous baccalaureate degree.
2. Have successfully completed the first two years of the OT professional sequence. The BGS degree would normally then be awarded at the end of Professional Year Two, prior to beginning the Graduate School career, if the student has completed all general UND university graduation requirements, including:
   1. 120 total credits,
   2. A minimum of 30 from UND,
   3. 36 credits upper-level credits,
   4. All essential studies requirements met (http://und.edu/academics/essential-studies/).

Students seeking the Master of Occupational Therapy degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Occupational Therapy Department.

To maintain graduate student status, the professional level Year III student is required to maintain a GPA of at least 3.0 for all work completed in Year III. Students who were previously on academic or professional probation will be dismissed from the School of Graduate Studies if placed on one additional probation within the professional program.

### M.O.T Curriculum Sequence

**PLAN OF STUDY GRID**

**Professional Year 1**

<table>
<thead>
<tr>
<th>Semester</th>
<th>Courses</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Summer</td>
<td>OT 422 Anatomy Occupational Therapy</td>
<td>5</td>
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<td></td>
<td>OT 426 Personal/Professional Development</td>
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</tr>
<tr>
<td></td>
<td><strong>Credits</strong></td>
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</tr>
<tr>
<td>Fall</td>
<td>OT 423 Fundamentals of Neuroscience for OT</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>OT 425 Occupational Therapy with Infants Pre-School Children</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td><strong>Credits</strong></td>
<td><strong>8</strong></td>
</tr>
<tr>
<td>Spring</td>
<td>OT 427 Orientation to Occupational Therapy</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>OT 428 Quantitative Research Methods-O.T.</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>OT 431 Medical Science I</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td><strong>Credits</strong></td>
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</tr>
</tbody>
</table>

| Summer   | OT 424 Muscle Function in Health and Disease | 4       |

### Required Courses

- **Pre-Requisites:**
  - OT 200 Introduction to Occupational Therapy
  - Arts and Humanities Electives
  - Other:
    - College Algebra
    - General Chemistry I
    - Psychology
    - Anatomy
    - Human Physiology
    - Social Science Electives
    - Other electives as needed

### Minimum Credits

- **Total Credits:** 57-56
- **Arts and Humanities Electives:**
  - Required:
    - College Algebra
    - General Chemistry I
    - Psychology
    - Anatomy
    - Human Physiology
    - Social Science Electives
    - Other electives as needed
- **Minimum Credits:**
  - Arts and Humanities Electives: 9

**Additional Requirements:**

- **Overall GPA:** 2.75 or 3.0 in both junior and senior years.
- **Fieldwork Information:**
  - Many fieldwork facilities are requiring proof of immunizations, drug testing, fingerprints, and/or criminal background checks. It is the responsibility of the student to check the fieldwork information and to pay the cost for each process.

**Global Diversity Requirement:**

- You must have fulfilled the global diversity requirement.
- More information can be found at: [http://www.und.edu/dept/Registrar/EssentialStudies/esindex.html](http://www.und.edu/dept/Registrar/EssentialStudies/esindex.html).
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>OT 429</td>
<td>Occupational Therapy with School Age Children and Young Adults</td>
<td>4</td>
</tr>
<tr>
<td>OT 430</td>
<td>Psychosocial Aspects of Occupational Therapy for Children, Adolescents and Young Adults</td>
<td>4</td>
</tr>
<tr>
<td>OT 432</td>
<td>Medical Science II</td>
<td>3</td>
</tr>
<tr>
<td>OT 433</td>
<td>Group Leadership Skills in Occupational Therapy</td>
<td>2</td>
</tr>
<tr>
<td>OT 438</td>
<td>Practicum: Children/Adolescents</td>
<td>1</td>
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**Professional Year 2**

**Summer**

**Elective Only Semester:**

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<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>OT 488</td>
<td>Elective Fieldwork in Occupational Therapy</td>
<td>3-9</td>
</tr>
<tr>
<td>OT 497</td>
<td>Cooperative Education</td>
<td>1-6</td>
</tr>
<tr>
<td>OT 593</td>
<td>Teaching Experience in Occupational Therapy</td>
<td>1-3</td>
</tr>
<tr>
<td></td>
<td><strong>Total Credits</strong></td>
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**Schedule A**

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>OT 454</td>
<td>Gerontic Occupational Therapy</td>
<td>2</td>
</tr>
<tr>
<td>OT 456</td>
<td>Psychosocial Aspects of OT with the Maturing Adult</td>
<td>4</td>
</tr>
<tr>
<td>OT 458</td>
<td>Qualitative Research Methods for Occupational Therapy</td>
<td>3</td>
</tr>
<tr>
<td>OT 460</td>
<td>Introduction to Management and Leadership</td>
<td>2</td>
</tr>
<tr>
<td>OT 462</td>
<td>Physical Dysfunction Seminar and Practicum Integration</td>
<td>3</td>
</tr>
<tr>
<td>OT 469</td>
<td>Interprofessional Health Care (Schedule A or B)</td>
<td>1</td>
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<td><strong>Total Credits</strong></td>
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**Schedule B**

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<tbody>
<tr>
<td>OT 451</td>
<td>Multicultural Competency in Occupational Therapy</td>
<td>3</td>
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<tr>
<td>OT 452</td>
<td>Assistive Technology I</td>
<td>3</td>
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<tr>
<td>OT 453</td>
<td>Physical Aspects of OT with the Maturing Adult</td>
<td>5</td>
</tr>
<tr>
<td>OT 458</td>
<td>Qualitative Research Methods for Occupational Therapy</td>
<td>3</td>
</tr>
<tr>
<td>OT 460</td>
<td>Introduction to Management and Leadership</td>
<td>2</td>
</tr>
<tr>
<td>OT 462</td>
<td>Physical Dysfunction Seminar and Practicum Integration</td>
<td>3</td>
</tr>
<tr>
<td>OT 480</td>
<td>Introduction to Scholarly Writing in Occupational Therapy</td>
<td>1</td>
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**Fall**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>OT 451</td>
<td>Multicultural Competency in Occupational Therapy</td>
<td>3</td>
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<tr>
<td>OT 454</td>
<td>Gerontic Occupational Therapy</td>
<td>2</td>
</tr>
<tr>
<td>OT 456</td>
<td>Psychosocial Aspects of OT with the Maturing Adult</td>
<td>4</td>
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<tr>
<td>OT 461</td>
<td>Management in the U.S. Healthcare System</td>
<td>2</td>
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<td>OT 463</td>
<td>Psychosocial Dysfunction Seminar and Practicum Integration</td>
<td>3</td>
</tr>
<tr>
<td>OT 469</td>
<td>Interprofessional Health Care (Schedule A or B)</td>
<td>1</td>
</tr>
<tr>
<td>OT 480</td>
<td>Introduction to Scholarly Writing in Occupational Therapy</td>
<td>1</td>
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**Fall and Spring Semester Electives:**

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<tr>
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<tbody>
<tr>
<td>OT 489</td>
<td>Independent Projects</td>
<td>1-3</td>
</tr>
<tr>
<td>OT 490</td>
<td>Occupational Therapy Seminar</td>
<td>1</td>
</tr>
<tr>
<td>OT 493</td>
<td>Workshop</td>
<td>1-12</td>
</tr>
<tr>
<td>OT 494</td>
<td>Directed Study in Occupational Therapy</td>
<td>1</td>
</tr>
<tr>
<td>OT 496</td>
<td>Community Experience</td>
<td>1-4</td>
</tr>
<tr>
<td>OT 497</td>
<td>Cooperative Education</td>
<td>1-6</td>
</tr>
<tr>
<td>OT 593</td>
<td>Teaching Experience in Occupational Therapy</td>
<td>1-3</td>
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**Credits**

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<tr>
<th>Course Code</th>
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<tbody>
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<td>OT 489</td>
<td>Elective Fieldwork in Occupational Therapy</td>
<td>3-9</td>
</tr>
<tr>
<td>OT 497</td>
<td>Cooperative Education</td>
<td>1-6</td>
</tr>
<tr>
<td>OT 593</td>
<td>Teaching Experience in Occupational Therapy</td>
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**Professional Year 3**

**Summer**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>OT 585</td>
<td>Fieldwork in Psychosocial Dysfunction</td>
<td>9</td>
</tr>
<tr>
<td>or OT 587</td>
<td>Fieldwork in Physical Dysfunction</td>
<td>9</td>
</tr>
<tr>
<td>OT 585</td>
<td>Fieldwork in Psychosocial Dysfunction</td>
<td>9</td>
</tr>
<tr>
<td>or OT 587</td>
<td>Fieldwork in Physical Dysfunction</td>
<td>9</td>
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<tr>
<td>OT 593</td>
<td>Teaching Experience in Occupational Therapy</td>
<td>1-3</td>
</tr>
<tr>
<td>OT 599</td>
<td>Special Topics in Occupational Therapy</td>
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**Fall**

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<tr>
<td>OT 493</td>
<td>Workshop</td>
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</tr>
<tr>
<td>OT 508</td>
<td>Therapeutic Procedures and Modalities in Occupational Therapy</td>
<td>2</td>
</tr>
<tr>
<td>OT 582</td>
<td>Graduate Practicum</td>
<td>1-3</td>
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<tr>
<td>OT 593</td>
<td>Teaching Experience in Occupational Therapy</td>
<td>1-3</td>
</tr>
<tr>
<td>OT 599</td>
<td>Special Topics in Occupational Therapy</td>
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**Credits**

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<tbody>
<tr>
<td>OT 493</td>
<td>Workshop</td>
<td>1-12</td>
</tr>
<tr>
<td>OT 508</td>
<td>Therapeutic Procedures and Modalities in Occupational Therapy</td>
<td>2</td>
</tr>
<tr>
<td>OT 582</td>
<td>Graduate Practicum</td>
<td>1-3</td>
</tr>
<tr>
<td>OT 593</td>
<td>Teaching Experience in Occupational Therapy</td>
<td>1-3</td>
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<tr>
<td>OT 599</td>
<td>Special Topics in Occupational Therapy</td>
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**Total Credits**

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<tr>
<td></td>
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</table>

**Studies**

- Department reserves the right to cancel a track and/or elective courses due to finances, staffing issues, or low enrollment. Electives are scheduled based on student interest and faculty resources. Class size may be limited.
Physical Therapy

Doctor of Physical Therapy (p. 520)

PT 101. Orientation Physical Therapy. 1 Credit.
Overview of the educational requirements, practice issues, and opportunities in the profession of physical therapy. Course content includes multimedia presentations, lectures, and observation in clinical settings.

PT 402. Professional Communication and Behavior. 2 Credits.
Lecture and practice in interprofessional and interpersonal communication including professional behavior, ethics, patient education, and written documentation. Prerequisite: Registered in Professional Physical Therapy Curriculum.

PT 409. Clinical Pathology I. 3 Credits.
Selected pathological conditions affecting the musculoskeletal system. Associated orthopedic diagnoses, surgical interventions, the influences of co-morbidities and pharmaceutical interventions, and safety concerns are discussed with an application to physical therapy patient/client management. Laboratory. Prerequisite: Registered in Professional Physical Therapy Curriculum. S.

PT 410. Clinical Pathology II. 3 Credits.
Selected pathological conditions of body systems, associated surgical interventions, the influence of co-morbidities, pharmaceutical interventions, and safety concerns are discussed with application to physical therapy patient/client management. Laboratory. Prerequisite: Registered in Professional Physical Therapy Curriculum. SS.

PT 412. Biomechanics and Kinesiology. 4 Credits.
Biomechanics and kinesiology of musculature acting on the extremities and trunk. Clinical applications and evaluation of joint integrity and mobility, gait, range of motion and muscle performance. Laboratory. Prerequisite: Registered in Professional Physical Therapy Curriculum. S.

PT 413. Exercise in Health and Disease. 3 Credits.
Basic foundation for theoretical and practical application of exercise science principles for physical therapists. Exercise science principles are applied to healthy individuals and individuals with disease, impairments, and/or functional limitations. Examination and intervention procedures incorporate aerobic capacity/endurance, anthropometric characteristics, and muscle performance activities. Laboratory. Prerequisite: Registered in Professional Physical Therapy Curriculum. S.

PT 415. Motor Control. 3 Credits.
Lecture and laboratory work in therapeutic exercise to establish and maintain muscular control and coordination, including muscle re-education, facilitation, and relaxation. Laboratory. Prerequisite: Registered in Professional Physical Therapy Curriculum.

PT 417. Clinical Examination and Evaluation I. 4 Credits.
Emphasizes patient/client management elements of examination and evaluation. Emphasis is given to the musculoskeletal and neurological systems. Laboratory. Prerequisite: Registered in Professional Physical Therapy Curriculum.

PT 420. Musculoskeletal System Examination. 2 Credits.
Principles of musculoskeletal examination and evaluation including identification and palpation of surface anatomy, range of motion (ROM), measurement of joint ROM, and evaluation of muscle performance. Laboratory. Prerequisite: Registered in Professional Physical Therapy Curriculum. F.

PT 422. Anatomy for Physical Therapy. 5 Credits.
Detailed lectures and demonstrations on musculoskeletal anatomy and neuromotor anatomy. Laboratory. Prerequisite: Registered in Professional Physical Therapy Curriculum.

PT 423. Neuroscience for Physical Therapy. 4 Credits.
Structure and function of the human nervous system including pathophysiology and clinical applications relevant to physical therapy practice. Prerequisite: Registered in Professional Physical Therapy Curriculum. F.

PT 426. Manual Therapy I. 2 Credits.
Introduction to joint mobilization/manipulation techniques. Emphasis is on mobilization/manipulation as it relates to peripheral joints and soft tissues of the human body. Basic examination, evaluation, and intervention techniques for the spine are also presented. Laboratory. Prerequisite: Registered in Professional Physical Therapy Curriculum. S.

PT 425. Introduction to Patient/Client Care and Interventions. 4 Credits.
Basic physical therapy patient care skills addressing multiple areas of physical therapy practice. A sample of topics address injury to the integument, select interventions for all patients, positioning of patients, vital signs, aseptic technique, and basic wheelchair techniques. Laboratory. Prerequisite: Registered in professional physical therapy curriculum. F.

PT 490. Special Topics: Physical Therapy. 1-4 Credits.
Introduction and investigation of advanced clinical procedures and topics. Topics discussed will be dictated by student and faculty interests. Prerequisite: Registered in Professional Physical Therapy Curriculum. Repeatable to 4 credits.

PT 491. Independent Study. 1-4 Credits.
Research and independent study in a specialized area of Physical Therapy. Prerequisite: Registered in Professional Physical Therapy Curriculum.

PT 510. Integrated Clinical Experience. 1 Credit.
Short-term clinical experience to provide hands-on experience for students to apply knowledge learned during the first year of the professional program. Experiences will be set up in acute care, sub-acute care, long-term care, outpatient orthopedic, or a rural site. Prerequisite: Registered in Professional Physical Therapy Curriculum. Repeatable to 3 credits. F, S, SS.

PT 511. Applied Movement Science and Rehabilitation Procedures. 4 Credits.
Integration of clinical evaluation, functional goals, and treatment planning for individuals with neurological and multiple musculoskeletal dysfunction. The primary focus is on rehabilitation skills including assessment, exercise, handling techniques, functional activities, equipment prescription, patient education, and ADLs, as well as community mobility and governmental services. Laboratory. Prerequisite: Registered in Professional Physical Therapy Curriculum.

PT 512. Therapeutic Agents. 3 Credits.
Theory and application of various hydrotherapy, phototherapy, and thermotherapy modalities in Physical Therapy, including heat, light, sound, and water. Laboratory. Prerequisite: Registered in Professional Physical Therapy Curriculum.

PT 514. Case Management I. 2 Credits.
Integrates multiple aspects of case management, including examination, evaluation, diagnosis, prognosis, plan(s) of care, and intervention strategies. Evidence based clinical decision making and verbal and written communications relative to case management will be emphasized. Prerequisite: Registered in Professional Physical Therapy Curriculum. SS.

PT 519. Electrotherapy and Electrodiagnosis. 2 Credits.
Theory and application of therapeutic electrical currents, biofeedback, electromyography, and nerve conduction velocity in physical therapy. Laboratory. Prerequisite: Registered in Professional Physical Therapy Curriculum.

PT 521. Critical Inquiry I. 1 Credit.
Introduction to the collection of clinical data leading to a case study report. Prerequisite: Registered in Professional Physical Therapy Curriculum.

PT 522. Administration in Physical Therapy. 3 Credits.
Lectures/discussion and seminar formats used to explore concepts of administration procedures as applied to Physical Therapy and the health care delivery system. Prerequisite: Registered in Professional Physical Therapy Curriculum.

PT 523. Lifespan I. 3 Credits.
Content related to human development; age-appropriate patient/client management; family-centered care; health promotion and safety; and legislative, policy, and systems are applied to pediatric patient/client management. Evidence-based practice for specific, common pediatric conditions is emphasized in the application of core content concepts. Laboratory. Prerequisite: Registered in Professional Physical Therapy Curriculum. S.

PT 524. Psychological Aspects of Disability. 2 Credits.
Readings and discussion course. Study of psychological coping mechanisms, reactions, and motivational factors pertinent to people with disabilities. Review of adjustment problems unique to specific disabilities and/or disease processes, including terminal illness. Prerequisite: Registered in Professional Physical Therapy Curriculum.
PT 525. Clinical Examination and Evaluation II. 3 Credits.
Emphasis is given to physical therapy examination, evaluation, and diagnoses as related to an advanced dynamic biomechanical evaluation. Also included will be the integration of NMS and support systems; clinical reasoning resulting in referral and/or modified physical therapy interventions; and the communication of findings and recommendations. Lecture Laboratory. Prerequisite: Registered in Professional Physical Therapy Curriculum. F.S.

PT 526. Manual Therapy II. 2 Credits.
Theory and application of manual therapy skills for examination and intervention techniques, including thrust and nonthrust mobilizations; manipulations of the spine, pelvis, and associated areas. Laboratory. Prerequisite: Registered in Professional Physical Therapy Curriculum. F.

PT 527. Critical Inquiry II. 2 Credits.
Application, analysis, and evaluation of clinical decision-making components, strategies, and skills. Preparation and presentation of a clinical case study. Prerequisite: Registered in Professional Physical Therapy Curriculum. S.

PT 528. Clinical Education I. 9 Credits.
The first in a sequence of four full-time clinical experiences in selected physical therapy provider centers throughout the United States. Prerequisite: Registered in Professional Physical Therapy Curriculum.

PT 529. Clinical Education II. 9 Credits.
The second in a sequence of four full-time clinical experiences in selected physical therapy provider centers throughout the United States. Prerequisite: Registered in Professional Physical Therapy Curriculum.

PT 535. Lifespan II. 2 Credits.
Examine the factors and forces that affect life quality in later years. The physiological, psychological, and sociological aspects of aging will be considered, including those influences in the cultural context that enhance and impede continued growth of the person. Laboratory. Prerequisite: Registered in Professional Physical Therapy Curriculum.

PT 537. Strategies Early Intervention. 2 Credits.
This course is designed to review current practices in early intervention. Course materials will focus on characteristics of disabling conditions that influence growth and development of motor skills, cognition, and educational development. Emphasis will be on collaborative service provision with an interdisciplinary approach. Topics also covered include: current issues, assessment of the child/family unit, and legislative guidelines for service provision. Prerequisite: Registered in Professional Physical Therapy Curriculum.

PT 538. Advanced Topics in Pediatric Physical Therapy. 3 Credits.
This course is designed to present current and advanced topics relating to pediatric physical therapy clients and their families. Prerequisite: Registered in Professional Physical Therapy Curriculum.

PT 539. Prevention and Wellness. 2 Credits.
The theory and practice of prevention of injury, maintenance and improvement of wellness, and promotion of health and healthy behaviors across the lifespan. Concepts are applied to the general, athletic, and industrial populations, with a view to interprofessional involvement in wellness optimization. Prerequisite: Registered in Professional Physical Therapy Curriculum.

PT 540. Cardiopulmonary Physical Therapy. 2 Credits.
This course is designed to expand the theoretical understanding and clinical application of cardiopulmonary physical therapy examination, evaluation, diagnosis, prognosis, intervention and outcomes. Laboratory. Prerequisite: Registered in Professional Physical Therapy Curriculum.

PT 541. Clinical Examination and Evaluation III. 3 Credits.
Emphasizes patient/client management elements of examination and evaluation. Emphasis is given to systems screening, physical therapy diagnoses, and clinical reasoning resulting in referral and/or modified physical therapy interventions. Emphasis is also given to the communication of findings. Laboratory. F.

PT 544. Pharmacology for Physical Therapists. 1 Credit.
Pharmacological principles and implications for the clinical treatment of patients referred to physical therapy. Fundamentals of drug classification, actions of drugs, physiological mechanisms, and drug therapeutic and adverse effects. Prerequisite: Registered in Professional Physical Therapy Curriculum. SS.

PT 545. Medical Imaging for Physical Therapists. 2 Credits.
An introduction to medical imaging and an overview of its role in the health care delivery system. Topics include principles of medical imaging, imaging equipment, diagnostic imaging, and application of imaging principles to inform physical therapy care. Prerequisite: Registered in Professional Physical Therapy Curriculum. SS.

PT 549. Advanced Applied Anatomy/Clinical Kinesiology. 2 Credits.
Study of applied anatomy and its importance to research and clinical application, particularly as related to Physical Therapy. Prerequisite: Registered in Professional Physical Therapy Curriculum.

PT 550. Interprofessional Health Care. 1 Credit.
A process-learning course intended to provide experience in building a team of health professionals from different professions. The focus is on learning to work effectively with an interprofessional health care team. Emphasis is placed on effective teamwork, the unique contributions of different professions, patient or family centered approach in health care delivery, effective communication, and awareness of potential medical errors. Prerequisite: Registered in Professional Physical Therapy Curriculum. F.S.

PT 552. Clinical Education III. 9 Credits.
The third in a sequence of four full-time clinical experiences in selected physical therapy provider centers throughout the United States. Prerequisite: Registered in Professional Physical Therapy Curriculum.

PT 553. Clinical Education IV. 9 Credits.
The fourth in a sequence of four full-time clinical experiences in selected physical therapy provider centers throughout the United States. Prerequisite: Registered in Professional Physical Therapy Curriculum.

PT 561. Seminar: Physical Therapy. 1-4 Credits.
This course serves to focus student attention toward graduate study in Physical Therapy. Explore and discuss areas of interest for students and faculty. May repeat to 4 credits maximum. Prerequisite: Registered in Professional Physical Therapy Curriculum. Repeatable to 4 credits.

PT 562. Readings: Physical Therapy. 1-4 Credits.
Review of current literature pertinent to Physical Therapy; critical examination of design, content, and validity of conclusions. Prerequisite: Registered in Professional Physical Therapy Curriculum. Repeatable to 4 credits.

PT 564. Evidence in Practice. 2 Credits.
Application of qualitative and quantitative research designs. Interpretation of statistical tests used in evidence-based medicine. Critical review of current articles related to diagnosis, prognosis, therapy, harm, cost, systematic reviews, meta-analysis, and clinical practice guidelines. Application of evidence to physical therapy practice. Prerequisite: Registered in Professional Physical Therapy Curriculum.

Individualized study of a particular area of interest for the student approved by his/her major advisor and supervised by preceptors with specialty and/or recognized expertise in the area of interest. Study may include library research, clinical research, discussion/seminars, projects, and directed clinical experience. Prerequisite: Registered in Professional Physical Therapy Curriculum. Repeatable to 12 credits.

PT 591. Research in Physical Therapy. 2 Credits.
Students develop the ability to effectively and accurately interpret and communicate results/clinical outcomes as a component of the written Scholarly Project. Frequent group and/or individual meetings with the advisor incorporate peer review discussion to facilitate student development of professional written and oral communication skills. Prerequisite: Registered in Professional Physical Therapy Curriculum. SS.
Doctor of Physical Therapy

Admission Requirements

Pre-Physical Therapy

Prior to admission, a minimum of 90 semester hours of credit from an approved college or university is required. Students should be broadly educated in the sciences and humanities. The Department of Physical Therapy recognizes that, since physical therapy deals with people, an understanding of literature, art, history, ethics, and philosophy is an adjunct to a physical therapist. Science and humanities are both viewed as necessary for the practice of physical therapy.

The following list of courses and credits indicates the core prerequisites all applicants must complete prior to admission to the physical therapy program. It is strongly recommended that students be computer literate prior to entering the professional program. Students may take additional electives from any field of study; however, the depth of the pre-physical therapy education should demonstrate that students have progressed from simple to complex studies in at least one content area. This requirement might typically be demonstrated by a discipline major, but in any case should demonstrate a basic comprehensiveness and integrity of study within a particular content area. This does not suggest that a separate undergraduate degree must be awarded; however, the breadth and depth in a discipline should be demonstrated. Course credits equivalent to a minor, i.e., approximately 20 credits at UND, in a particular discipline could accomplish this requirement. The prospective student should include eight (8) credits from upper level courses, i.e., 300 and/or 400 numbers.

- Two semesters of General Biology (8 cr.)
- Two semesters of General Chemistry (8 cr.)
- Two semesters of General Physics (8 cr.)
- One semester of Human Anatomy (3 cr.)
- One semester of Human Physiology (3 to 4 cr.)
- One semester of Introductory Psychology (3 cr.)
- One semester of Developmental Psychology (3 to 4 cr.)
- One semester of Abnormal Psychology (3 cr.)
- One semester of a Public Speaking course (3 cr.)
- One semester of an undergraduate statistics course (3 cr.)
- Essential Studies requirements

All of the prerequisite coursework must be completed before entering the professional program; however, the prospective student may be enrolled in pre-professional coursework at the time of application. All students must apply for the professional program through the PTCAS system. WICHE-eligible students should also apply through the WICHE certification process. Please refer to the UND-PT website at: www.med.und.edu/physical-therapy for application details.

Admission Requirements

Acceptance is on a competitive basis, with the major determinant being the basic science grade point average. The basic science GPA is defined as: biology (eight semester credits), chemistry (eight semester credits), physics (eight semester credits), anatomy (three semester credits), physiology (four semester credits), and psychology (seven semester credits). In addition to the science GPA, GRE score, and cumulative GPA, an interview and letters of reference will be considered in the admission process. Prospective students are expected to complete at least 60 hours of physical therapy observation prior to application.

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. Completion of the application for admission to the professional program and UND School of Graduate Studies application form.
2. Submission of score from the Graduate Record Examination General Test.
3. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.
4. Applicants who have received their bachelors or masters degree in the United States or English-speaking Canada are not required to submit the TOEFL or IELTS.

Degree Requirements

1. Students must be formally accepted into the professional education component of the DPT and endorsed by the Chair of Physical Therapy.

   NOTE: Acceptance by the UND Office of Admissions or the School of Graduate Studies does not constitute acceptance into the professional program in Physical Therapy.

2. The professional education component of the DPT will require three academic years and two summer sessions following completion of the pre-physical therapy entrance requirements.

3. No student will be allowed to remain in the program or complete the full-time clinical experiences unless he/she attains a letter grade of at least “C” in the major courses.

4. To advance to candidacy, the student must successfully complete the first year comprehensive examination, and maintain a cumulative School of Graduate Studies GPA of # 3.00 AND/OR a summer session GPA of # 3.00. Students who fail to advance to candidacy during the first year will be dismissed from the professional program.

5. After advancement to candidacy, the student is expected to maintain a cumulative GPA of # 3.00. The School of Graduate Studies will monitor the cumulative GPA, which must be # 3.00. If the cumulative GPA is not # 3.00, the School of Graduate Studies policies for probation and dismissal will govern the student’s status.

6. Students in the professional program should be aware there are special requirements for clinical uniforms, professional liability insurance, medical insurance, immunizations, CPR certification, and completion of a criminal background check. These requirements must be met prior to any clinical contact with patients. The student will also be responsible for travel, housing, and food costs, in addition to the payment of tuition and fees, during the full-time clinical experience semesters. The majority of these experiences will be completed at geographical locations other than the City of Grand Forks.

7. Prospective students should be aware that a felony conviction may affect a graduate’s ability to obtain a professional license to practice physical therapy.

8. The faculty reserves the right to place on professional probation or to cancel the registration of any student in Physical Therapy whose performance in the classroom or the clinic is unsatisfactory.

Pre-Physical Therapy

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ENGL 110</td>
<td>College Composition I</td>
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</tr>
<tr>
<td>ENGL 130</td>
<td>Composition II: Writing for Public Audiences</td>
<td>3</td>
</tr>
<tr>
<td>COMM 110</td>
<td>Fundamentals of Public Speaking</td>
<td>3</td>
</tr>
<tr>
<td>Fine Arts and Humanities</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>BIOL 150 &amp; 150L</td>
<td>General Biology I and General Biology I Laboratory</td>
<td>4</td>
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<tr>
<td>BIOL 151 &amp; 151L</td>
<td>General Biology II and General Biology II Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 121 &amp; 121L</td>
<td>General Chemistry I and General Chemistry I Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 122 &amp; 122L</td>
<td>General Chemistry II and General Chemistry II Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>Social Science</td>
<td>3</td>
<td></td>
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<tr>
<td>PSYC 111</td>
<td>Introduction to Psychology</td>
<td>3</td>
</tr>
</tbody>
</table>
**Bachelor of General Studies Degree with Health Studies Option**

This degree will be available to Physical Therapy students who:

1. do not already have a baccalaureate degree,
2. have completed at least 30 of the 90 pre-Physical Therapy credits at UND before beginning Professional Year One,
3. have successfully completed fall, spring and summer semesters of Professional Year One.

The BGS degree would normally then be awarded at the end of the summer semester of Professional Year One if the student has completed all general UND graduation requirements:

- 120 total credits,
- 30 credits from UND,
- 36 upper-level credits,
- all essential studies requirements.

**Professional Program - Physical Therapy**

### Professional Year 1

**Fall**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
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<tbody>
<tr>
<td>PT 402</td>
<td>Professional Communication and Behavior</td>
<td>2</td>
</tr>
<tr>
<td>PT 420</td>
<td>Musculoskeletal System Examination</td>
<td>2</td>
</tr>
<tr>
<td>PT 422</td>
<td>Anatomy for Physical Therapy</td>
<td>5</td>
</tr>
<tr>
<td>PT 423</td>
<td>Neuroscience for Physical Therapy</td>
<td>4</td>
</tr>
<tr>
<td>PT 435</td>
<td>Introduction to Patient/Client Care and Interventions</td>
<td>4</td>
</tr>
<tr>
<td>PT 510</td>
<td>Integrated Clinical Experience (Each semester during year one, a small group of students will perform a learning event outside of the PT department.)</td>
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**Spring**

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<tr>
<th>Course Code</th>
<th>Course Name</th>
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<tbody>
<tr>
<td>PT 409</td>
<td>Clinical Pathology I</td>
<td>3</td>
</tr>
<tr>
<td>PT 412</td>
<td>Biomechanics and Kinesiology</td>
<td>4</td>
</tr>
<tr>
<td>PT 413</td>
<td>Exercise in Health and Disease</td>
<td>3</td>
</tr>
<tr>
<td>PT 415</td>
<td>Motor Control</td>
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<tr>
<td>PT 417</td>
<td>Clinical Exam and Evaluation I</td>
<td>4</td>
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<tr>
<td>PT 426</td>
<td>Manual Therapy I</td>
<td>2</td>
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<tr>
<td>PT 510</td>
<td>Integrated Clinical Experience (Each semester during year one, a small group of students will perform a learning event outside of the PT department.)</td>
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**Summer**

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<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>PT 410</td>
<td>Clinical Pathology II</td>
<td>3</td>
</tr>
<tr>
<td>PT 510</td>
<td>Integrated Clinical Experience (Each semester during year one, a small group of students will perform a learning event outside of the PT department.)</td>
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<tr>
<th>Course Code</th>
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<tr>
<td>PT 512</td>
<td>Therapeutic Agents</td>
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**Professional Year 2**

**Fall**

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<tr>
<td>PT 521</td>
<td>Critical Inquiry I</td>
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<tr>
<td>PT 528</td>
<td>Clinical Education I</td>
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<tr>
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<td>Clinical Education II</td>
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**Spring**

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<th>Course Code</th>
<th>Course Name</th>
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<tbody>
<tr>
<td>PT 522</td>
<td>Administration in Physical Therapy</td>
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<tr>
<td>PT 523</td>
<td>Lifespan I</td>
<td>3</td>
</tr>
<tr>
<td>PT 524</td>
<td>Psychological Aspects of Disability</td>
<td>2</td>
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<tr>
<td>PT 525</td>
<td>Clinical Examination and Evaluation II</td>
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<tr>
<td>PT 527</td>
<td>Critical Inquiry II</td>
<td>2</td>
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<tr>
<td>PT 540</td>
<td>Cardiopulmonary Physical Therapy</td>
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<tr>
<td>PT 584</td>
<td>Evidence in Practice</td>
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<tr>
<td>PT 550</td>
<td>Interprofessional Health Care</td>
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**Professional Year 3**

**Fall**

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<th>Course Code</th>
<th>Course Name</th>
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<tbody>
<tr>
<td>PT 511</td>
<td>Applied Movement Science and Rehabilitation Procedures</td>
<td>4</td>
</tr>
<tr>
<td>PT 526</td>
<td>Manual Therapy II</td>
<td>2</td>
</tr>
<tr>
<td>PT 539</td>
<td>Prevention and Wellness</td>
<td>2</td>
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<tr>
<td>PT 541</td>
<td>Clinical Examination and Evaluation III</td>
<td>3</td>
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<tr>
<td>PT 561</td>
<td>Seminar: Physical Therapy</td>
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<tr>
<td>PT 550</td>
<td>Interprofessional Health Care</td>
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**Spring**

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<th>Course Name</th>
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<tr>
<td>PT 552</td>
<td>Clinical Education III</td>
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<tr>
<td>PT 553</td>
<td>Clinical Education IV</td>
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<tr>
<td>PT 995</td>
<td>Scholarly Project</td>
<td>1</td>
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</tbody>
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**Physician Assistant Studies**

Master of Physician Assistant Studies (p. 523)

**Courses**

PA 507. Medical Human Anatomy & Radiology I. 3 Credits.

This online course is a review of the basic principles of anatomy in preparation for the clinical phase of the PA program. The students will be introduced to components of radiologic diagnostic studies such as X-ray, CT scans and other forms of imaging. Prerequisite: Admission to Master of Physician Assistant Studies Program, SS.
PA 508. Medical Human Anatomy & Radiology II. 3 Credits.
This course is held online and on the UND campus and is a continued review of the basic principles of anatomy in preparation for the clinical phase of the PA program. The students will review radiologic diagnostic studies such as x-ray, CT scans and other forms of imaging. Prerequisite: Admission to Master of Physician Assistant Studies Program. F.

PA 510. Human Physiology & Pathophysiology I. 4 Credits.
This system-based online course focuses on the physiologic and pathophysiologic functions of the human body from the cellular level, to organ systems, with emphasis on genetics. This course lays the foundation for understanding the underlying principles of human disease processes across the lifespan. Prerequisite: Admission to Master of Physician Assistant Studies Program. F.

PA 511. Human Physiology & Pathophysiology II. 4 Credits.
Continuation of PA 510. This system-based online course focuses on the physiologic and pathophysiologic functions of the human body from the cellular level, to organ systems. This course lays the foundation for understanding the underlying principles of human disease processes across the lifespan. Prerequisites: Admission to Master of Physician Assistant Studies Program and PA 510. F.

PA 512. History and Physical Exam I. 2 Credits.
This online course focuses on patient assessment including communication strategies for interviewing and eliciting a medical history, techniques for performing a basic physical examination, and accurate documentation of patient data. Normal and abnormal findings involving patients across the lifespan are also presented. Instruction in preventive health, behavioral science psychological development is also emphasized. Prerequisite: Admission to Master of Physician Assistant Studies Program. SS.

PA 513. History and Physical Exam II. 2 Credits.
Continuation of PA 512. This course is online and concludes with instruction on the UND campus. The course focuses on patient assessment including communication strategies for interviewing and eliciting a medical history, techniques for performing a basic physical examination, and accurate documentation of patient data. Normal and abnormal findings involving patients across the lifespan are also presented. Instruction in preventive health, behavioral science psychological development is also emphasized. Clinical skill labs are utilized to instruct physical examination skills while on campus. Prerequisite: Admission to Master of Physician Assistant Studies Program. F.

PA 516. EKG Interpretation. 1 Credit.
This online course focuses on the principles and practical application of electrocardiography for the PA. Prerequisite: Admission to Master of Physician Assistant Studies Program. F.

PA 517. Pharmacology I. 2 Credits.
This online system-based course focuses on the pharmacokinetic, pharmacodynamic, and pharmacogenetic concepts of the major drug classes across the lifespan. Federal regulations governing drug development, drug schedules, drug safety and legislation are included. In addition, drug interactions and contraindications and calculation of mathematical equivalents utilized in prescribing medications are reviewed. Prerequisite: Admission to Master of Physician Assistant Studies Program. SS.

PA 518. Pharmacology II. 2 Credits.
Continuation of PA 517. This online course-based course focuses on the pharmacokinetic, pharmacodynamic, and pharmacogenetic concepts of the major drug classes across the lifespan. In addition, drug interactions and contraindications and complementary and over the counter medications are discussed. Prerequisite: Admission to Master of Physician Assistant Studies Program and PA 517. F.

PA 521. Diagnostic Studies I. 2 Credits.
This online course focuses on laboratory, radiologic, and other diagnostic studies and acceptable values across the lifespan. Components encompass areas of radiology, hematology, chemistry, urinalysis, immunology, genetic and molecular testing and microbiology. Emphasis will include routine and preventative studies and differentiation of normal from abnormal diagnostic findings. Prerequisite: Admission to Master of Physician Assistant Studies Program. F.

PA 522. Diagnostic Studies II. 2 Credits.
Continuation of PA 521. This online course focuses on laboratory, radiologic, and other diagnostic studies in relation to disease processes across the lifespan using a system-based approach. Components encompass areas of radiology, hematology, chemistry, urinalysis, immunology, genetic and molecular testing and microbiology. Emphasis on systems such as cardiology, respiratory, and endocrinology that are consistent with the concurrent primary care course content. Emphasis will also include using diagnostic studies to help guide patient care. Prerequisites: Admission to Master of Physician Assistant Studies Program. S.

PA 523. Diagnostic Studies III. 2 Credits.
Continuation of PA 522. This online course focuses on laboratory, radiologic and other diagnostic studies in relation to disease processes across the lifespan using a system-based approach. Components encompass areas of radiology, hematology, chemistry, urinalysis, immunology, genetic and molecular testing and microbiology. Emphasis on systems such as neurology, reproduction, and behavioral science that are consistent with the concurrent primary care course content. Emphasis will also include analyzing patient findings and formulating comprehensive diagnostic evaluations for medical management. Prerequisites: Admission to Master of Physician Assistant Studies Program. SS.

PA 525. Scholarly Project Development. 3 Credits.
This online course provides a brief review of statistical principles as applied in medical literature with specific focus on research methods. Implementing principles of evidence-based medicine; students will learn to critically appraise the value and significance of medical research to determine application in clinical practice. Aspects of population health will also be discussed as students select a topic and complete a project proposal for the scholarly project. Prerequisite: Admission to Master of Physician Assistant Studies Program. SS.

PA 540. Clinical Medicine: Primary Care I - Didactic. 5 Credits.
This didactic course is held online and on the UND campus. Content is focused on the problem solving process for the diagnosis and management of acute and chronic medical conditions across the life span. Emphasis is placed on analyzing symptoms of disease and formulating differential diagnoses using a system-based approach. Systems such as cardiology, respiratory and endocrinology are included. Pharmacology and pharmacotherapeutics used to treat acute and chronic conditions in system-based areas are included. Simulation and skill labs are utilized to further enhance critical thinking and medical decision making for treatment of patients across the life span. Prerequisite: Admission to Master of Physician Assistant Studies Program. S.

PA 541. Clinical Medicine: Primary Care I Clinical. 5 Credits.
This supervised clinical practical experience in a primary care setting allows students to apply communication strategies for interviewing and eliciting a medical history, techniques for performing a basic physical examination, and accurate documentation of patient data. Students will also start to focus on analyzing symptoms of disease, formulating differential diagnoses and treatment plans for patients across the life span. Prerequisites: Admission to Master of Physician Assistant Studies Program. S.

PA 550. Clinical Medicine: Primary Care II - Didactic. 5 Credits.
This didactic course is held online and on the UND campus. Content is focused on the problem solving process for the diagnosis and management of acute and chronic medical conditions across the life span. Emphasis is placed on analyzing symptoms of disease and formulating differential diagnoses using a system-based approach. Systems such as neurology, reproduction and behavioral science are included. Pharmacology and pharmacotherapeutics used to treat acute and chronic conditions in system-based areas are included. Emphasis also on managing patients in emergency settings. Simulation and skill labs are utilized to further enhance critical thinking and medical decision making for treatment of patients across the life span. Prerequisites: Admission to Master of Physician Assistant Studies Program. S.

PA 551. Clinical Medicine: Primary Care II Clinical. 4 Credits.
This supervised clinical practical experience in a primary care setting allows students to continue focusing and developing differential diagnoses and treatment plans for patients with complex medical disease across the life span. Prerequisites: Admission to Master of Physician Assistant Studies Program. SS.
PA 560. Clinical Medicine: Primary Care III - Didactic. 3 Credits.
This didactic course is held online and on the UND campus. Content is focused on the problem solving process for the diagnosis and management of acute and chronic medical conditions across the life span. Emphasis is placed on analyzing symptoms of disease and formulating differential diagnoses using a system-based approach. Systems such as hematology and conditions such as cancer are included. Pharmacology and pharmacotherapeutics used to treat acute and chronic conditions in system-based areas are included. Emphasis also on managing patients with multiple co-morbidities in emergency, clinical, and surgical settings. Simulation and skill labs are utilized to further enhance critical thinking and medical decision making for treatment of patients across the life span. Prerequisite: Admission to Master of Physician Assistant Studies Program. F.

PA 561. Clinical Medicine: Primary Care III - Clinical. 4 Credits.
This supervised clinical practice experience in a primary care setting allows students to continue focusing and developing differential diagnoses and treatment plans for patients with complex medical disease across the life span. Prerequisite: Admission to Master of Physician Assistant Studies Program. F.

PA 566. Professional Issues & Role Development I. 2 Credits.
This online course discusses role definition and historical development for the physician assistant within the health care industry. The importance of professionalism as an expression of positive values and ideals demonstrating a high level of responsibility, ethical practice and sensitivity to a diverse patient population is also discussed. Prerequisite: Admission to Master of Physician Assistant Studies Program. S.

PA 567. Professional Issues & Role Development II. 1 Credit.
Continuation of PA 566. This online course discusses further levels of professionalism with respect to adherence to legal and regulatory requirements, health care delivery systems and health policy, including rural and underserved populations. Cultural diversity and inclusion principles are also discussed. Prerequisites: Admission to Master of Physician Assistant Studies Program and successful completion of PA 566. SS.

PA 568. Professional Issues & Role Development III. 1 Credit.
Continuation of PA 567. This online course discusses additional aspects of professionalism including accountability to patients, society and the profession, commitment to excellence and ongoing professional development. The importance of intellectual honesty and appropriate conduct will also be discussed. Tills course will also assist in preparing the student for clinical employment by stressing the importance of the interview, contract negotiations, privileges, certification, licensure and maintenance. Prerequisites: Admission to Master of Physician Assistant Studies Program and successful completion of PA 567. F.

PA 569. Professional Issues & Role Development IV. 1 Credit.
Continuation of PA 568. This online course introduces the PA student to quality of care and reimbursement methods. Students will further understand the importance of patient safety and risk management as well as develop a response to medical ethics. Comprehensive role development will also prepare the student for entry level practice. Prerequisites: Admission to Master of Physician Assistant Studies Program and successful completion of PA 568. S.

PA 570. Clinical Medicine - Primary Care Clinical Continuation. 1-5 Credits.
Continuation - This supervised clinical practice experience in a primary care setting allows students to continue to focus and develop differential diagnoses and treatment plans for patients with complex medical disease across the life span. The course provides flexibility in scheduling experiences to complete the required components of the Masters in Physician Assistant Studies Program. Prerequisite: Admission to Master of Physician Assistant Studies Program. Repeatable to 7 credits. S/U grading. F,S,SS.

PA 571. Rural/Underserved Primary Care Clinical. 3 Credits.
This required supervised clinical practice experience in a rural or underserved primary care setting allows students to focus on analyzing symptoms of disease, formulating differential diagnoses and treatment plans for patients across the life span. Caring for rural or underserved patient populations will be the focus of this experience. Prerequisite: Admission to Master of Physician Assistant Studies Program. S/U grading. F,S,SS.

PA 580. Specialty Clerkship. 5-6 Credits.
This supervised clinical practical experience is designed to expose the student to different disciplines of medicine to fulfill program requirements as determined by UND faculty advisor, community preceptor and PA student and as necessary for adequate entry level PA practice. One credit of PA 588 may be substituted for one of the required 6 credits. Prerequisite: Admission to Master of Physician Assistant Studies Program. S.

PA 581. Emergency Department Clerkship. 4 Credits.
This required supervised clinical practical experience focuses on analyzing symptoms and formulating differential diagnoses of emergent and traumatic condition across the life span. This clerkship is intended to provide the student with hands-on experience in the care of patients with urgent and emergent conditions. Prerequisite: Admission to Master of Physician Assistant Studies Program. F,S,SS.

PA 582. General Surgery Clerkship. 4 Credits.
This required supervised clinical practical experience focuses on analyzing symptoms and formulating differential diagnoses of patients requiring surgical interventions. This clerkship is intended to provide the student with hands-on experience in the care of patients with surgical conditions. Emphasis is placed on the role of the PA in a surgical setting to enhance skills in sterile techniques, surgical assisting, suturing, documentation and pre-post-operative patient care. Prerequisite: Admission to Master of Physician Assistant Studies Program. F,S,SS.

PA 588. Global Health Clerkship. 1 Credit.
Course content elective - This course emphasizes healthcare challenges and opportunities within vulnerable and underserved populations around the world and includes clinical hands-on experience in an international setting. Students will be responsible for any additional costs associated with this course including but not limited to: passports, visas, immunizations, travel, travel and health insurance, room and board, and any other incidental costs incurred during the rotation. One credit of PA 588 may be substituted for one of the credits required in PA 580. Prerequisites: Admission to Master of Physician Assistant Studies Program and approval from the Director of the Physician Assistant Program. S/U grading. On demand.

PA 589. Readings in Physician Assistant Studies. 1-2 Credits.
Course content elective - Selected review and reading of current professional literature in areas pertaining to the practice of a Physician Assistant. In collaboration with the faculty member, reading selection and method of evaluation are determined. Prerequisites: Admission to Master of Physician Assistant Studies Program and approval from the Director of the Physician Assistant Program. Repeatable to 6 credits. On demand.

PA 599. Special Topics in Physician Assistant Studies. 1-2 Credits.
Course content elective - A series of clinically relevant lectures, discussions, and/or supervised practice clinical experiences developed around the practice of a Physician Assistant. Prerequisites: Admission to Master of Physician Assistant Studies Program and approval from the Director of the Physician Assistant Program. Repeatable to 6 credits. On demand.

PA 990. Continuing Enrollment in Physician Assistant Studies. 1-6 Credits.
Course content elective - This course provides additional time, if needed to complete required components of the Masters in Physician Assistant Studies. Repeatable to 12 credits maximum. Prerequisites: Admission to Master of Physician Assistant Studies Program and approval from the Director of the Physician Assistant Program. Repeatable to 12 credits. S/U grading. On demand.

PA 995. Scholarly Project. 3 Credits.
This online course allows the student to complete the scholarly project. Continued review and critique of the literature related to the topic area are required to formulate and write the final product. Students will also work with their advisor to objectively evaluate the scholarly project outcome. Prerequisite: Admission to Master of Physician Assistant Studies Program. F.

PA 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

Master of Physician Assistant Studies

Admission Requirements
Applicants who are seeking admission to School of Graduate Studies must meet all of the minimum general School of Graduate Studies admission requirements identified in the graduate catalog. In addition, the prospective student must fulfill the requirements for admission to the graduate program in the Department of Physician Assistant Studies. Admission to the Physician Assistant Program within the School of Medicine and Health Sciences at the University of North Dakota is a competitive selection process. Each applicant is reviewed individually and evaluated on their own merits.
For complete requirements, please see our website for the most current information regarding prerequisites and application instructions at http://www.med.und.edu/physician-assistant/.

**Degree Requirements:**

Bachelor’s degree or graduate degree at a regionally accredited institution within the United States.

**Health Care Requirements:**

**Entry Point 1:** Minimum of 3 years recent full-time experience as a licensed/certified health professional. Health care experience must include direct patient contact and high levels of responsibility involving complex critical thinking and decision-making skills.

**Entry Point 2:** Minimum of 500 hours (1000 preferred) direct hands-on supervised patient care.

**Preceptor Requirements:**

**Entry Point 1:** Apply as a team with a licensed physician (MD or DO) or physician assistant (PA) who is willing to serve as the primary care clinical preceptor. Medical practice must be in primary care/family medicine.

**Entry Point 2:** Applicants will be placed within a designated site to complete clinical rotations.

**Prerequisite Coursework:**

- Human Anatomy
- Human Physiology
- Microbiology
- Medical Terminology
- Statistics
- Organic Chemistry/Biochemistry/Cellular Biology/Molecular Biology (Entry Point 2 Only)
- Psychology (Entry Point 2 Only)

**Admission Preference**

North Dakota residents as well as residents from the surrounding states of Montana, Minnesota, and South Dakota are given admission preference. Applicants from rural or underserved communities are also awarded preference.

**Entry Point 1:** Applicants are accepted from all over the United States. Preference is given to clinical sites in rural (<25,000 population) or underserved populations.

**Entry Point 2:** Applicants must be from North Dakota, Montana, Minnesota, or South Dakota. Applicants from outside those states will not be considered. Preference is evaluated based on a combination of residence, employment, and volunteer experience in rural or underserved communities.

**Additional Requirements**

1. Complete applications to CASPA and the UND School of Graduate Studies along with all supporting materials as explained at: How to Apply (https://med.und.edu/physician-assistant/how-to-apply.html).
2. Complete a preceptor profile if applying under Entry Point 1 admission criteria.
3. Complete a successful interview.
4. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.
5. Comply with the Academic and Technical Standards (https://med.und.edu/physician-assistant/standards.html) for matriculation, promotion, and graduation.
6. Complete a health screening and a criminal background check prior to matriculation.

**Degree Requirements**

Students seeking the Master of Physician Assistant Studies degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Physician Assistant Program.

1. Successful completion of all courses in core curriculum.
2. Completion of a written scholarly project approved by the academic advisor.
3. Written comprehensive final examination.

**Required Courses:**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PA 507</td>
<td>Medical Human Anatomy &amp; Radiology I</td>
<td>3</td>
</tr>
<tr>
<td>PA 508</td>
<td>Medical Human Anatomy &amp; Radiology II</td>
<td>3</td>
</tr>
<tr>
<td>PA 510</td>
<td>Human Physiology &amp; Pathophysiology I</td>
<td>4</td>
</tr>
<tr>
<td>PA 511</td>
<td>Human Physiology &amp; Pathophysiology II</td>
<td>4</td>
</tr>
<tr>
<td>PA 516</td>
<td>EKG Interpretation</td>
<td>1</td>
</tr>
<tr>
<td>PA 517</td>
<td>Pharmacology I</td>
<td>2</td>
</tr>
<tr>
<td>PA 518</td>
<td>Pharmacology II</td>
<td>2</td>
</tr>
<tr>
<td>PA 521</td>
<td>Diagnostic Studies I</td>
<td>2</td>
</tr>
<tr>
<td>PA 522</td>
<td>Diagnostic Studies II</td>
<td>2</td>
</tr>
<tr>
<td>PA 523</td>
<td>Diagnostic Studies III</td>
<td>2</td>
</tr>
<tr>
<td>PA 525</td>
<td>Scholarly Project Development</td>
<td>3</td>
</tr>
<tr>
<td>PA 540</td>
<td>Clinical Medicine: Primary Care I - Didactic</td>
<td>5</td>
</tr>
<tr>
<td>PA 541</td>
<td>Clinical Medicine: Primary Care I Clinical</td>
<td>5</td>
</tr>
<tr>
<td>PA 550</td>
<td>Clinical Medicine: Primary Care II - Didactic</td>
<td>5</td>
</tr>
<tr>
<td>PA 551</td>
<td>Clinical Medicine: Primary Care II - Clinical</td>
<td>4</td>
</tr>
<tr>
<td>PA 560</td>
<td>Clinical Medicine: Primary Care III - Didactic</td>
<td>3</td>
</tr>
<tr>
<td>PA 561</td>
<td>Clinical Medicine: Primary Care III - Clinical</td>
<td>4</td>
</tr>
<tr>
<td>PA 566</td>
<td>Professional Issues &amp; Role Development I</td>
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<tr>
<td>PA 567</td>
<td>Professional Issues &amp; Role Development II</td>
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<td>PA 568</td>
<td>Professional Issues &amp; Role Development III</td>
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<tr>
<td>PA 569</td>
<td>Professional Issues &amp; Role Development IV</td>
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</tr>
<tr>
<td>PA 580</td>
<td>Specialty Clerkship</td>
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<tr>
<td>PA 581</td>
<td>Emergency Department Clerkship</td>
<td>4</td>
</tr>
<tr>
<td>PA 582</td>
<td>General Surgery Clerkship</td>
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</tr>
<tr>
<td>PA 995</td>
<td>Scholarly Project</td>
<td>3</td>
</tr>
<tr>
<td>PA 512</td>
<td>History and Physical Exam I</td>
<td>2</td>
</tr>
<tr>
<td>PA 513</td>
<td>History and Physical Exam II</td>
<td>2</td>
</tr>
<tr>
<td>PA 570</td>
<td>Clinical Medicine - Primary Care Clinical Continuation</td>
<td>7</td>
</tr>
<tr>
<td>PA 571</td>
<td>Rural/Underserved Primary Care Clinical</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits: 90

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**Physics and Astrophysics**

M.S. in Physics and Astrophysics (p. 526)
Ph.D. in Physics and Astrophysics (p. 526)

Five-Year B.S.-M.S. in Physics (p. 525)

**Courses**

**PHYS 509. Methods of Theoretical Physics. 3 Credits.**
An introduction to the mathematical methods currently used in physics.

**PHYS 510. Methods of Theoretical Physics. 3 Credits.**
A continuation of Physics 509 introduction to the mathematical methods currently used in physics.

**PHYS 511A. Physics for Teachers I. 3 Credits.**
Prerequisite: PHYS 511L.

**PHYS 511B. Physics for Teachers II. 3 Credits.**
Prerequisite: PHYS 511A.

**PHYS 511L. Physics for Teachers I Lab. 2 Credits.**
Prerequisite: Department consent.

**PHYS 512A. Physics for Teachers II. 3 Credits.**
Prerequisite: PHYS 512L.
Undergraduate Courses for Graduate Credit

PHYS 402. Computers in Physics. 3 Credits.
Computer applications in physics, that may include data analysis, numerical simulation, symbolic and algebraic programming, parallel computing, computer interfacing and/or experimental physics applications. Prerequisites: PHYS 252 and knowledge of a higher-level computer programming language, or consent of instructor. On demand.

PHYS 428. Advanced Physics Laboratory. 2 Credits.
Advanced undergraduate experiments in physics, using modern techniques and instrumentation. Classic experiments leading to the current understanding of physical theory. Prerequisite: PHYS 253 or approval of instructor. F, odd years.

PHYS 431. Quantum Mechanics I. 3 Credits.
An introduction to quantum mechanics with applications to atomic structure. Prerequisite: PHYS 253. Prerequisite or Corequisite: PHYS 317 or approval of department. F, even years.

PHYS 432. Quantum Mechanics II. 3 Credits.
Further development of basic quantum theory with application to atomic, molecular, solid state and nuclear physics. Prerequisite or Corequisite: PHYS 431 or consent of instructor. S, odd years.

PHYS 434. Nuclear Physics. 3 Credits.
Introduction to the theory of atomic nuclei, fundamental forces and sub-atomic particles. Prerequisite: PHYS 253 or approval of instructor. F, odd years.

PHYS 437. Introductory Solid State Physics. 3 Credits.
A general introduction to solid state phenomena. Prerequisite: PHYS 253 or approval of instructor. F, even years.

PHYS 460. Introduction to Astrophysics. 3 Credits.
Nature of stars. Topics include celestial mechanics, relativity, optics, stellar birth, stellar interiors and evolution, nucleosynthesis, stellar death, compact objects, black holes, neutron stars, white dwarfs, binaries and variable stars. Some topics include the use of computer tools to solve problems. Prerequisite: PHYS 253 or approval of instructor. F, even years.

PHYS 461. Introduction to Astrophysics II. 3 Credits.
Galaxies and the universe. Topics include structure and evolution of galaxies, the Milky Way, stellar populations, globular clusters, interstellar medium, big bang, Hubble and the distance scale, radio galaxies, quasars, jets, blazars, clusters and superclusters of galaxies and cosmology. Some topics include the use of computer tools to solve problems. Prerequisite: PHYS 460 or approval of instructor. S, odd years.

PHYS 492. Special Problems. 1-3 Credits.
Selected problems in physics or astrophysics. Prerequisite: Approval of the department. Repeatable to 9 credits. On demand.

5-year B.S.-M.S. Degree Program in Physics

The program will use only the existing courses in the Department of Physics and Astrophysics, Department of Mathematics, and Department of Chemistry.

The program course requirements include the following courses:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 251</td>
<td>University Physics I</td>
</tr>
<tr>
<td>PHYS 252</td>
<td>University Physics II</td>
</tr>
<tr>
<td>PHYS 253</td>
<td>University Physics III</td>
</tr>
<tr>
<td>PHYS 317</td>
<td>Mechanics I</td>
</tr>
<tr>
<td>PHYS 318</td>
<td>Mechanics II</td>
</tr>
<tr>
<td>PHYS 324</td>
<td>Thermal Physics</td>
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<tr>
<td>PHYS 325</td>
<td>Optics</td>
</tr>
<tr>
<td>PHYS 325L</td>
<td>Optics Laboratory</td>
</tr>
<tr>
<td>PHYS 327</td>
<td>Electricity and Magnetism I</td>
</tr>
<tr>
<td>PHYS 328</td>
<td>Electricity and Magnetism II</td>
</tr>
<tr>
<td>PHYS 415</td>
<td>Undergraduate Research Experience</td>
</tr>
<tr>
<td>PHYS 428</td>
<td>Advanced Physics Laboratory</td>
</tr>
<tr>
<td>PHYS 431</td>
<td>Quantum Mechanics I</td>
</tr>
<tr>
<td>PHYS 432</td>
<td>Quantum Mechanics II</td>
</tr>
<tr>
<td>PHYS 509</td>
<td>Methods of Theoretical Physics</td>
</tr>
</tbody>
</table>
Doctor of Philosophy in Physics and Astrophysics

Admission Requirements

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

Applicants who are seeking admission to School of Graduate Studies must meet all of the minimum general School of Graduate Studies admission requirements identified in the graduate catalog. In addition, prospective students must fulfill the requirements for admission to the graduate program in Physics and Astrophysics.

1. Successful completion of a master’s degree (Some programs permit bypassing the master’s degree and allow for direct admission to the Ph.D. degree. Check specific department requirements for admission.)
2. An overall GPA of 3.0 for all graduate work.
3. Completed all undergraduate preparation.
4. Presentation of scores on the GRE General Test and advanced physics test is recommended.
5. Be recommended for doctoral work by the department.

Degree Requirements

Students seeking the Doctor of Philosophy degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Physics and Astrophysics Department.

The degree is a research degree and is conferred only in recognition of high achievement in independent scientific research and scholarship.

1. Completion of 90 semester credits beyond the baccalaureate degree.
2. Maintenance of at least a 3.0 GPA for all classes completed as a graduate.
3. With approval of a student’s Faculty Advisory Committee, up to one-half of the work beyond a master’s degree (maximum of 30 semester credit hours) may be transferred from another institution that offers post-master’s degrees in the discipline.
4. In addition to PHYS 590 Research, the coursework will amount to approximately 36 hours.
5. Completion of a regular core of courses which includes:
   - PHYS 509 Methods of Theoretical Physics
   - PHYS 510 Methods of Theoretical Physics
   - PHYS 539 Quantum Mechanics
   - PHYS 540 Quantum Mechanics
   - PHYS 541 Theory Electricity Magnetism
   - PHYS 542 Theory Electricity Magnetism

   Total Credits 92-107

Master of Science in Physics and Astrophysics

Admission Requirements

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. A four-year bachelor’s degree from a recognized college or university.
2. A cumulative Grade Point Average (GPA) of at least 2.75 for all undergraduate work (2.5 for M. Engr.) or a GPA of at least 3.0 for the junior and senior year of undergraduate work (based on a 4.0 scale).
3. Completed a minimum of 21 semester credits of undergraduate physics, plus mathematics through differential equations or the equivalent.
4. Coursework should include intermediate courses in mechanics, electricity and magnetism, optics, thermal physics, and modern quantum physics. Adequate preparation in general chemistry is also necessary.
5. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.
6. An applicant without satisfactory undergraduate training may be admitted to the program, but will be required to remove deficiencies by completing the necessary undergraduate courses without receiving graduate credit for them.
7. Ph.D. applicants are encouraged to submit the Graduate Record Examination scores for the general test and advanced physics test.

Degree Requirements

Students seeking the Master of Science degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Physics and Astrophysics Department.

The program is designed to provide the student with basic physics courses at the graduate level and an introduction to research.

1. Minimum of 30 semester credits in a major field, including the credits granted for the thesis and the research leading to the thesis.
2. At least one-half of the credits must be at or above the 500-level.
3. A maximum of one-fourth (usually 8-9 semester credits) of the credit hours required for the degree may be transferred from another institution.

Doctor of Philosophy in Physics and Astrophysics

Admission Requirements

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

Applicants who are seeking admission to School of Graduate Studies must meet all of the minimum general School of Graduate Studies admission requirements identified in the graduate catalog. In addition, prospective students must fulfill the requirements for admission to the graduate program in Physics and Astrophysics.

1. Successful completion of a master’s degree (Some programs permit bypassing the master’s degree and allow for direct admission to the Ph.D. degree. Check specific department requirements for admission.)
2. An overall GPA of 3.0 for all graduate work.
3. Completed all undergraduate preparation.
4. Presentation of scores on the GRE General Test and advanced physics test is recommended.
5. Be recommended for doctoral work by the department.

Degree Requirements

Students seeking the Doctor of Philosophy degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Physics and Astrophysics Department.

The degree is a research degree and is conferred only in recognition of high achievement in independent scientific research and scholarship.

1. Completion of 90 semester credits beyond the baccalaureate degree.
2. Maintenance of at least a 3.0 GPA for all classes completed as a graduate.
3. With approval of a student’s Faculty Advisory Committee, up to one-half of the work beyond a master’s degree (maximum of 30 semester credit hours) may be transferred from another institution that offers post-master’s degrees in the discipline.
4. In addition to PHYS 590 Research, the coursework will amount to approximately 36 hours.
5. Completion of a regular core of courses which includes:
   - PHYS 509 Methods of Theoretical Physics
   - PHYS 510 Methods of Theoretical Physics
   - PHYS 539 Quantum Mechanics
   - PHYS 540 Quantum Mechanics
   - PHYS 541 Theory Electricity Magnetism
   - PHYS 542 Theory Electricity Magnetism

   Total Credits 92-107
4. Complete the following courses:
   PHYS 509  Methods of Theoretical Physics  3
   PHYS 539  Quantum Mechanics  3
   PHYS 541  Theory Electricity Magnetism  3
   PHYS 545  Analytical Mechanics  3

5. Complete six additional hours from the following:
   PHYS 510  Methods of Theoretical Physics  3
   PHYS 540  Quantum Mechanics  3
   PHYS 542  Theory of Electricity and Magnetism  3

6. Complete research project and PHYS 998 Thesis (4-9 credits).

Psychology

M.A. in Psychology (p. 530)
Ph.D. in Clinical Psychology (p. 528)
M.S. in Forensic Psychology (p. 531)
M.A. in Forensic Psychology (p. 530)
Ph.D. in General/Experimental Psychology (p. 529)
Graduate Minor in Psychology (p. 529)
Certificate in Behavioral Data Analytics (p. 529)
Certificate in Cyber Security and Behavior (p. 529)

Courses

PSYC 501. Psychological Foundations Educ. 3 Credits.
A study of the learning process with secondary emphasis on how the learning process is affected by individual differences, growth, development, and personality. Prerequisite: Graduate standing in Psychology or Education.

PSYC 505. History of Psychology. 3 Credits.
Historical development of modern psychology with an emphasis on experimental and systematic phases of early psychological thought, on important issues during the growth of psychology, and on current trends. Prerequisite: Graduate standing in Psychology or Counseling.

PSYC 520. Foundations of Forensic Psychology. 3 Credits.
Prerequisite: Graduate status in Psychology or permission of instructor.

PSYC 521. Diversity Psychology. 3 Credits.
The purpose of this course is to provide students with an advanced consideration of the major issues in the study of diversity as it applies to the field of psychology. Prerequisite: Graduate status in Psychology or permission of instructor.

PSYC 522. Human Factors in Cyber Security. 3 Credits.
This course examines the critical role human behavior plays in maintaining or conversely endangering cyber security. The science of human attention, perception, learning, and cognition is applied to the problem of maintaining secure cyber systems. On demand.

PSYC 523. Forensic Assessment. 3 Credits.
This course is designed to provide students with 1) a review of assessment measures used in forensic assessment 2) an in-depth study of ethical and professional issues in forensic assessment, and 3) training in writing assessment reports. Prerequisite: Graduate status in Psychology or permission of instructor. SS, even years.

PSYC 524. Psychology and Law. 3 Credits.
An in-depth examination of the interaction between the disciplines of psychology and law. The course will look at how psychological research and theories are applied to contemporary legal issues. Prerequisite: Graduate status in Psychology or permission of instructor.

PSYC 525. Insider Threat Analysis. 3 Credits.
This course provides an in-depth examination and analysis of what is referred to as insider threat. Insider threat is when a current or former employee or other person that has "insider access" such as contractors, outsiders, and even cloud-computing vendors compromises the security of a cyber-system or application either intentionally or unintentionally. Insider threats are often considered the greatest cyber security risks. On demand.

PSYC 526. Psychological Profiling and Criminal Behavior. 3 Credits.
Prerequisite: Graduate status in Psychology or permission of instructor.

PSYC 528. Forensic Psychology Capstone. 3 Credits.
The culminating course for the Forensic Psychology Master of Arts program. Students are provided with the opportunity to synthesize knowledge and skills acquired throughout their program. Prerequisites: Graduate status in MA Forensic Psychology, PSYC 997, and expected graduation of the summer semester the course is taken.

PSYC 533. Theories of Learning. 3 Credits.
Examination of the evidences in support of the various systematic theories of learning. Prerequisite: Graduate standing in Counseling or Psychology or consent of instructor.

PSYC 537. Physiology of Behavior and Psychophysiological Measurement. 3 Credits.
This is an advanced graduate course covering major topics of physiological psychology while also introducing measurement techniques traditionally used in psychophysiological research. While physiology and anatomy of the central and peripheral nervous systems will be reviewed in this course, students are expected to have basic knowledge of neuroscience, behavioral science, and research methodology. Experiential learning activities will focus on the demonstration and practice of psychophysiological measurement and recording techniques, data analysis, and interpretation. Prerequisite: Graduate standing in Psychology or permission of instructor.

PSYC 539. Cognitive Psychology. 3 Credits.
An in-depth analysis and discussion (including laboratory work) of topics covering issues related to memory, attention, problem solving, comprehension, and thinking. Prerequisite: Graduate standing in Psychology or permission of instructor.

PSYC 540. Foundations of Behavioral Data Analytics. 3 Credits.
This course covers the process of inspecting, cleansing, transforming, and modeling quantitative data with the goal of discovering useful information, suggesting conclusions, and supporting decision-making. Behavioral data analytics has multiple facets and approaches, encompassing diverse techniques under a variety of names. In this course, we will cover data mining focused on modeling and knowledge discovery for predictive rather than purely descriptive purposes. Techniques for integrating data and for visualizing data will also be explored. On demand.

PSYC 541. Advanced Univariate Statistics. 3 Credits.
Theory of univariate statistics; application to quantitative data in psychology. Prerequisites: Graduate standing, college algebra, and elementary statistics.

PSYC 542. Multivariate Statistics for Psychology. 3 Credits.
The appropriate use and interpretation of multivariate data analytic techniques in psychology. Prerequisites: Graduate standing and PSYC 541.

PSYC 543. Experimental Design. 3 Credits.
Application of statistics and probability theory to the design and analysis of experiments. Prerequisite: PSYC 541 or consent of instructor.

PSYC 551. Advanced Developmental Psych. 3 Credits.
In-depth analysis and integration of theories and theorists relevant for current issues in lifespan developmental psychology. Prerequisite: Graduate status in Psychology or permission of instructor.

PSYC 560. Advanced Social Psychology. 3 Credits.
In-depth examination of the theoretical and empirical literature in social psychology focusing on attitudes, stereotyping and prejudice, interpersonal relationships, social cognition, personality and the self, and group behavior. Also includes additional course readings and written work beyond the requirements for Psychology 460. Prerequisite: Graduate status in Psychology or permission of instructor.

PSYC 565. Multicultural Psychology. 3 Credits.
Examinations of cross-cultural work in psychology with attention to race, ethnicity, and culture. Special emphasis is given to research, training, and treatment issues with minority groups, including the American Indian and other cultural groups. Prerequisite: Graduate status in Psychology.
PSYC 570. Clinical Assessment I: Basic Issues in Clinical Assessment. 4 Credits.
Provides the conceptual and practical frameworks upon which to build expertise in the assessment and prediction of human behavior in relation to intellectual indices and interviewing skills. Serves as a graduate foundation to explore, analyze, and discuss basic and applied issues relevant to psychological testing, the administration and interpretation of widely-used intellectual assessment instruments, and the opportunity to develop structured clinical interviewing techniques. Prerequisite: Clinical Psychology graduate status or consent of instructor.

PSYC 571. Clinical Assessment II: Advanced Issues in Clinical Assessment. 4 Credits.
Provides the conceptual and practical frameworks upon which to build expertise in the assessment and prediction of human behavior in relation to personality assessment, behavioral assessment, neuropsychological assessment, and the assessment of high incidence behavioral disorders. Skills in report writing and case conference presentation will also be developed. Prerequisites: PSYC 570 and/or consent of instructor.

PSYC 572. Community Psychology. 3 Credits.
Theories and practicum in community mental health consultation. Credits in 587 may be earned in conjunction with this course. Prerequisites: PSYC 571, PSYC 573, and graduate standing in Psychology.

PSYC 573. Theories of Psychotherapy. 3 Credits.
Theory and practicum in individual psychotherapy, with emphasis on systematic comparison of major theoretical viewpoints. Prerequisite or Corequisite: PSYC 571 and/or consent of instructor.

PSYC 574. Advanced Therapeutic Interventions. 3 Credits.
An in-depth study of the key issues of psychotherapy research with a focus on critical evaluation of the psychotherapy research literature and the development of knowledge of empirically supported approaches to psychotherapy with specific problems. Prerequisite: PSYC 573 or permission of instructor.

PSYC 575. Behavior Pathology. 3 Credits.
A survey of various forms of behavior pathology with emphasis upon current research and theories relating to pathology. Prerequisite: Graduate standing in psychology or instructor permission. F.

PSYC 576. Child Psychopathology and Treatment. 3 Credits.
An overview of child and developmental psychopathology including discussion of pertinent treatments for disorders such as conduct disorders, attention-deficit, substance abuse, and developmental disabilities. Prerequisites: PSYC 570 and PSYC 575, or instructor permission.

PSYC 579. Professional Issues and Ethics in Psychology. 3 Credits.
An exploration of ethical issues pertinent to the science and practice of psychology and discussion of current professional issues facing psychology. Prerequisite: Graduate standing in Psychology or permission of instructor.

PSYC 580. Clinical Practice. 1-3 Credits.
Supervised individual practice in techniques of individual psychotherapy, marital therapy, counseling, and guidance of parents and children, administration of psychological examinations, behavior modification, community mental health procedures, consultation, and other professional practices of the clinical psychologist. Prerequisites: PSYC 571, graduate standing in Psychology, and consent of instructor. Repeatable. S/U grading.

PSYC 587. Supervised Field Work. 1-3 Credits.
Used primarily for individualized field placement so that the student may acquire practicum experiences in clinical settings, community psychology, and group methods. Prerequisites: Graduate standing in Psychology and consent of instructor. Repeatable. S/U grading.

PSYC 593. Readings in Psychology. 1-3 Credits.
Prerequisites: Advanced standing in Psychology and consent of instructor. Repeatable.

PSYC 594. Special Topics in Psychology. 1-3 Credits.
Topical courses in Psychology organized on a semester-by-semester basis. Prerequisites: Graduate standing in Psychology or permission of instructor. Repeatable. On demand.

PSYC 595. Seminar in Psychology. 1-3 Credits.
Prerequisites: Consent of instructor.

PSYC 596. Individual Research. 1-6 Credits.
Repeatable.

PSYC 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

PSYC 997. Independent Study. 3 Credits.
The independent study is designed to require the student independently to investigate a topic related to the field of forensic psychology. The study need not be an original contribution to knowledge but may be a presentation, analysis, and discussion of information and ideas already in the literature. The requirement for independent study is to ensure that a student can investigate a topic and organize a scholarly report on the investigation. Prerequisite: Graduate status in the Master of Arts. F, S, SS.

PSYC 998. Thesis. 1-9 Credits.
Repeatable to 9 credits.

PSYC 999. Dissertation. 1-18 Credits.
Repeatable to 18 credits.

Doctor of Philosophy in Clinical Psychology

Admission Requirements
The applicant must meet the School of Graduate Studies' current minimum general admission requirements as published in the graduate catalog.

1. A four-year bachelor's degree from a recognized college or university. For U.S. degrees, accreditation must be by one of the six regional accrediting associations.
2. Eighteen (18) hours of undergraduate work in psychology including a course in General Psychology, Developmental, Abnormal, Statistics, and Experimental Psychology.
3. A cumulative Grade Point Average (GPA) of at least 3.2 for all undergraduate work.
4. Satisfy the School of Graduate Studies' English Language Proficiency requirements as published in the graduate catalog.
5. A year of biological science (biology, physiology, etc.).
6. A semester of college algebra.
7. General background in other social and natural sciences also recommended.
8. Graduate Record Examination— 30th percentile or higher on Verbal, Quantitative, and Analytic Writing.

Degree Requirements
Students seeking the Doctor of Philosophy degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Psychology Department.

1. Minimum of 60 credit hours beyond 30 credits from Masters degree work is required for the Ph.D. (minimum of 90 credit hours total).
2. Maintenance of at least a 3.0 GPA for all classes completed as a graduate student.
3. Completion of “Scholarly Tool” coursework to develop skills in research design including:
   - PSYC 541 Advanced Univariate Statistics 3
   - PSYC 542 Multivariate Statistics for Psychology 3
   - PSYC 543 Experimental Design 3
4. Completion of an empirical dissertation;
5. Graduate students in the clinical psychology Ph.D. program are required to meet a number of eligibility criteria to take comprehensive exams and establish candidacy for the Ph.D. degree. An assessment will be conducted after the student successfully completes all of the requirements for the Master of Science degree in general psychology. To remain in the Ph.D. program and proceed on to comprehensive exams, practicum assignments, dissertation research, and remaining coursework, the student must have:
   a. earned a cumulative graduate grade point average of at least 3.5;
   b. completed his or her M.S. degree within three years of enrollment;
   c. gained the approval of a majority of the core and associated faculty of the clinical psychology doctoral program.
Students failing to meet one or more of these requirements will be terminated from the Ph.D. program in clinical psychology.
Doctor of Philosophy in General/Experimental Psychology

Admission Requirements

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. A four-year bachelor’s degree from a recognized college or university. For U.S. degrees, accreditation must be by one of the six regional accrediting associations.
2. A cumulative Grade Point Average (GPA) of at least 3.20 for all undergraduate work.
3. Graduate Record Examination—30th percentile or higher on Verbal, Quantitative, and Analytic Writing.
4. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

Although not required, applicants are recommended to have a year of biological science (biology, physiology, etc.), a semester of college algebra, and a general background in other social and natural sciences.

Degree Requirements

Students seeking the Doctor of Philosophy degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Psychology Department.

1. Minimum of 60 credit hours beyond 30 credits from Masters degree work is required for the Ph.D. (minimum of 90 credit hours total).
2. Maintenance of at least a 3.0 GPA for all classes completed as a graduate student.
3. Completion of “Scholarly Tool” coursework to develop skills in research design including:
   - PSYC 541 Advanced Univariate Statistics 3
   - PSYC 542 Multivariate Statistics for Psychology 3
   - PSYC 543 Experimental Design 3
5. Graduate students in the general-experimental psychology Ph.D. program are required to meet a number of eligibility criteria to take comprehensive exams and establish candidacy for the Ph.D. degree. An assessment will be conducted after the student successfully completes all of the requirements for the Master of Science degree in general psychology. To remain in the Ph.D. program and proceed on to comprehensive exams, dissertation research, and remaining coursework, the student must have:
   a. earned a cumulative graduate grade point average of at least 3.5;
   b. completed his or her M.S. degree within three years of enrollment; and
   c. gained the approval of a majority of the core and associated faculty of the General/Experimental psychology doctoral program.

   Students failing to meet one or more of these requirements will be terminated from the Ph.D. program in general-experimental psychology.
6. Completion of the comprehensive examination for the Ph.D. in Experimental Psychology.

Graduate Certificate in Behavioral Data Analytics

Admission Requirements

Admission to the School of Graduate Studies. Students admitted to the certificate program are required to complete the three required courses below for a total of at least 9 credits.

Certificate Requirements

- PSYC 540 Foundations of Behavioral Data Analytics 3
- PSYC 541 Advanced Univariate Statistics 3
- PSYC 542 Multivariate Statistics for Psychology 3

Graduate Certificate in Cyber Security and Behavior

Admission Requirements

Admission to the School of Graduate Studies. Students admitted to the certificate program are required to complete the two required courses below and one elective for a total of at least 9 credits.

Certificate Requirements

Required courses:
- PSYC 522 Human Factors in Cyber Security 3
- PSYC 525 Insider Threat Analysis 3

Approved elective from the following:
- PSYC 433 Psychology of Learning 4
- PSYC 436 Perception 4
- PSYC 533 Theories of Learning 3
- PSYC 539 Cognitive Psychology 3

Graduate Minor in Psychology

Graduate students taking major work in other departments and graduate minor work in psychology for a master’s degree should have the equivalent
of an undergraduate minor in psychology with the following specific courses: PSYC 111 Introduction to Psychology, PSYC 250 Developmental Psychology, PSYC 270 Abnormal Psychology (or the equivalent). Any of the psychology courses, which carry graduate credit, are acceptable for the graduate minor.

Graduate students taking major work in another department and minor work in psychology for a doctoral degree, in addition to having the undergraduate preparation noted in the paragraph above, must also have completed a course in statistics and an undergraduate laboratory course in Experimental Psychology. No specific courses are required for the graduate minor except that all credits for the minor must be 500-level credits.

Master of Arts in Forensic Psychology

Admission Requirements

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. A baccalaureate degree from an accredited college or university with a behavioral or social science major allied with psychology, i.e., psychology, criminal justice, sociology, counseling or social work.
2. A cumulative undergraduate grade point average (GPA) of 3.0 or above, or a graduate degree GPA of 3.50.
3. Submission of a curriculum vitae and a personal statement describing:
   a. academic and professional accomplishments;
   b. reasons for pursuing a graduate degree in Forensic Psychology; and
   c. any additional information the applicant would like the admission committee to know.
4. Submission of three letters of recommendation from those who can comment on your academic abilities or ability to understand complex issues and think critically, e.g., former faculty member or work supervisor.
5. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

Degree Requirements

Students seeking the Master of Arts degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Department of Psychology. The exact requirements set forth by the Department of Psychology do not guarantee admission. Admission is a competitive process and meeting the following minimum eligibility requirements doesn't guarantee admission.

1. Applicants may be considered either as high school students or as undergraduates. High achieving high school students (GPA of at least 3.5/4.0 and an ACT score of 25 or higher) will initially be considered for “identified” status and become eligible for formal admission when they meet the same criteria that undergraduates must meet for admission.
2. All graduate admissions eligibility requirements (see academic catalog for the Accelerated Bachelor’s/Master’s (ABM) 5 Year Degree Program).
3. A minimum cumulative Grade Point Average (GPA) of at least 3.20 (based on A= 4.00) for all undergraduate work.
4. Completion of Introduction to Statistics (PSYC 241), Research Methods in Psychology (PSYC 303), and Advanced Research Methods (PSYC 304), with a minimum grade of B in each course.
5. Applicants who are undergraduates must have completed at least 1 credit of either Independent Research (PSYC 294) or Advanced Individual Research (PSYC 494) and must have earned a minimum grade of B for each credit.

Concentration A: Behavioral Data Analytics

• A minimum of 30 graduate credits.
• Nine (9) of the 30 credits must satisfy the requirements for the Graduate Certificate in Behavioral Data Analytics:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>PSYC 540</td>
<td>Foundations of Behavioral Data Analytics</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 541</td>
<td>Advanced Univariate Statistics</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 542</td>
<td>Multivariate Statistics for Psychology</td>
<td>3</td>
</tr>
</tbody>
</table>

• Eighteen (18) of the 30 credits are elective course credits at the 500-level or above which are approved by the respective advisory committee and documented in the Program of Study. A minimum of 12 credits must consist of course credits offered by the Department of Psychology.
• Three (3) of the 30 credits must for an Independent Study (PSYC 997). To successfully complete these credits, students must prepare a written independent research report and deliver an oral presentation of their results to the advisor and interested faculty.

Concentration B: Forensic Psychology

• A minimum of 30 graduate credits.
• Eighteen (18) of the 30 credits must include:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>PSYC 523</td>
<td>Forensic Assessment</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 524</td>
<td>Psychology and Law</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 540</td>
<td>Foundations of Behavioral Data Analytics</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 541</td>
<td>Advanced Univariate Statistics</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 543</td>
<td>Experimental Design</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 575</td>
<td>Behavior Pathology</td>
<td>3</td>
</tr>
</tbody>
</table>

• Three (3) of the 30 credits must for an Independent Study (PSYC 997). To successfully complete these credits, students must prepare a written independent research report and deliver an oral presentation of their results to the advisor and interested faculty.
independent research report and deliver an oral presentation of their results to the advisor and interested faculty.

- Choose three of the following Electives:

1. PSYC 539 Cognitive Psychology 3
2. PSYC 560 Advanced Social Psychology 3
3. PSYC 587 Supervised Field Work 1-3
4. PSYC 594 Special Topics in Psychology 1-3
5. CJ 515 Human Nature and Crime 3
6. CJ 535 Seminar in Juvenile Justice 3
7. CJ 565 Victimology 3

**Master of Science in Forensic Psychology**

**Admission Requirements - Accelerated Bachelor’s/Master’s (ABM) 5 year Degree**

The Accelerated Bachelor’s/Master of Science degree program allows exceptional high school students and undergraduate students at UND an opportunity to complete the requirements for both the bachelor’s and master’s degrees at an accelerated pace. High achieving high school students (GPA of at least 3.5/4.0 and an ACT score of 25 or higher) will initially be considered for "identified" status and become eligible for formal admission when they meet the same eligibility requirements that undergraduates must meet for admission. Admission is a competitive process and meeting the following minimum eligibility requirements doesn’t guarantee admission.

1. Applicants must meet the School of Graduate Studies’ current minimum general admission requirements for the Accelerated Bachelor’s/Master’s (ABM) 5 Year Degree Program as published in the graduate catalog.
2. A cumulative Grade Point Average (GPA) of at least 3.20 (based on A= 4.00) for all undergraduate work.
3. Completion of Introduction to Statistics (PSYC 241), Research Methods in Psychology (PSYC 303), and Advanced Research Methods (PSYC 304), with a minimum grade of B in each course.
4. Applicants who are undergraduates must have completed at least 1 credit of either Independent Research (PSYC 294) or Directed Individual Research (PSYC 494) and must have earned a minimum grade of B for each credit.

**Admission Requirements - Traditional 2-year Master of Science Degree**

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. Applicants must have a baccalaureate degree from an accredited college or university with a behavioral or social science major allied with psychology, e.g., psychology, criminal justice, sociology, counseling, and social work.
2. Applicants must have a cumulative undergraduate GPA of 3.2 or above or a graduate degree GPA of 3.5.
3. Applicant must also submit GRE scores, with Verbal, Quantitative, and Analytic Writing scores meeting or exceeding the 30th percentile. Applicants not meeting these standards may be admitted on a provisional basis with continued enrollment contingent on successful performance in the program.
4. A personal statement discussing:
   a. academic and professional accomplishments;
   b. reasons for pursuing a graduate degree in Forensic Psychology;
   c. research interests; and
   d. any additional information the applicant would like the admissions committee to know.
5. A curriculum vitae summarizing relevant experiences including but not limited to academic course work and work, volunteer, and research activities.

- Three letters of recommendation from those who can comment on the applicant’s academic abilities are also required. Consideration will be given for experience working in forensic areas or participating in research as an assistant prior to the program application.
- Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

**Degree Requirements**

Students seeking the Master of Science degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Forensic Psychology program.

Students in the M.S. Forensic Psychology Program at UND are required to complete 30 credits. This includes 18 credits of required coursework, 6 to 9 credits of elective courses, and either 6 credit hours of thesis credit (thesis option)* or 3 credits of Independent Study (non-thesis option). The Forensic Psychology program does not have a comprehensive examination.

- Requirements for Matriculating in the Thesis Track
  1. Overall GPA = 3.5
  2. Permission of Advisor and Program Director

**Required Courses (18 Credits):**

<table>
<thead>
<tr>
<th>Course</th>
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<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYC 523</td>
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<td>3</td>
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<td>PSYC 524</td>
<td>Psychology and Law</td>
<td>3</td>
</tr>
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<td>PSYC 541</td>
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</tr>
<tr>
<td>PSYC 543</td>
<td>Experimental Design</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 575</td>
<td>Behavior Pathology</td>
<td>3</td>
</tr>
</tbody>
</table>

**Elective Courses (6-9 credits):**

Choose two or three of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYC 539</td>
<td>Cognitive Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYC 560</td>
<td>Advanced Social Psychology</td>
<td></td>
</tr>
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<td></td>
</tr>
<tr>
<td>CJ 515</td>
<td>Human Nature and Crime</td>
<td></td>
</tr>
<tr>
<td>CJ 535</td>
<td>Seminar in Juvenile Justice</td>
<td></td>
</tr>
<tr>
<td>CJ 565</td>
<td>Victimology</td>
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</tbody>
</table>

**Thesis Option (6 Credits):**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYC 998</td>
<td>Thesis</td>
<td>1-9</td>
</tr>
</tbody>
</table>

**Non-Thesis Option (3 Credits):**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYC 997</td>
<td>Independent Study</td>
<td>3</td>
</tr>
</tbody>
</table>

Note: The student’s Advisory Committee will also consider other graduate classes as appropriate electives on a case-by-case basis. Students who have a strong psychology undergraduate background may, after review by the Committee, be permitted to substitute an appropriate forensic psychology class.

**Public Affairs**

- Master of Public Administration (p. 535)
- Combined M.P.A./J.D (p. 535)
- Combined B.S.P.A./M.P.A (p. 533)
- Certificate in Health Administration (p. 534)
- Certificate in Public Administration (p. 534)
- Certificate in Policy Analysis (p. 534)
- Certificate in Social Entrepreneurship (p. 535)
Courses

POLS 500. Research Methods. 3 Credits.
A statistics course or consent of instructor. This course will first focus on various approaches to analyzing political phenomena with the goal of developing students' ability to think analytically and to distinguish between empirical and normative analysis. The course will then introduce techniques of empirical research including research design, measurement, data gathering, and data analysis. Prerequisite: A statistics course or consent of instructor.

POLS 501. Political and Public Policy Analysis. 3 Credits.
This course focuses on the use of empirical data both to develop empirical theory and to make policy choices. Topics to be discussed include hypothesis testing, public choice, and policy evaluation. Students will be required to complete an original research project. Prerequisite: POLS 500 or consent of instructor.

POLS 502. Problems in State and Local Governments. 3 Credits.
Directed in-depth inquiry into contemporary structural and policy problems of state and local governments. During the course, each student will prepare a research paper relevant to a current problem suitable for publication and distribution to an identifiable body of public officials and citizens for problem-solving purposes. On demand.

POLS 503. Government and Business. 3 Credits.
This course is designed to make students aware of the interaction of business and government in our society and the importance of this interrelationship in an era of globalization. It introduces public and business administration students to the role of government in advancing, as well as regulating, business. Further it discusses ways that business can and does influence government decisions. It also looks at the ethical responsibilities of business and government in our society. A component of the course involves travel to Washington, D.C. to meet with political officials, e.g., the Congressional delegation; Legislative staff; government regulatory agencies, e.g., the Federal Communications Commission; government advocacy agencies, e.g., Department of Commerce; and national and international business representatives, e.g., Cargill.

POLS 508. Legislative and Executive Processes. 3 Credits.
Description, analysis, and evaluation of the structures, processes, procedures, and positions of the legislative and executive offices in government. On demand.

POLS 531. Foundations of Public Administration. 3 Credits.
An extensive overview of Public Administration stressing the basic concepts and trends in the discipline as well as the classic scholars. F.

POLS 532. Public Policy. 3 Credits.
A discussion of the initiation, formulation, adoption, implementation, and evaluation of American public policy. Various policy areas such as agriculture, education, environment, and welfare will be analyzed.

POLS 533. Administrative Ethics in the Public Sector. 3 Credits.
This course examines the challenges faced by public administrators in establishing personal standards of conduct in the administrative environment. Issues such as moral versus political accountability, social justice and whistle blowing are among the topics that will be explored in this course.

POLS 535. Public Organizations. 3 Credits.
Description and analysis of bureaucratic organizations with particular emphasis on concepts and characteristics common to public bureaucracies.

POLS 536. Public Personnel Administration. 3 Credits.
This course is designed to help managers in all positions of an organization to understand the fundamental nature of public personnel administration, also known as human resource management. Topics to be covered include basic functions such as position classification, wage and salary administration, and performance appraisal. Attention will be given to contemporary issues such as sexual harassment, affirmative action, privacy, and unionization.

POLS 537. Program Evaluation. 3 Credits.
This course introduces students to the theories and concepts of program evaluation research to analyzing the effectiveness of public programs and enhance decision-making. Students will be introduced to the principal theories and techniques in the field and develop understanding of the benefits and trade-offs of each. In addition, students will develop practical skills through the development of a detailed evaluation design and plan for implementation. S.
POL 599. Master of Public Administration Capstone. 1 Credit.
Seminar course intended to assist students in strengthening and further developing essential skills of research and formal presentation (written and oral) for both academic and professional audiences. Students will apply these skills to the completion of their individual Independent Study Project, providing an opportunity to draw upon knowledge and skills from across the program’s curriculum, and to synthesize these elements in the creation of a unique piece of rigorous professional policy analysis. Enrollment is restricted to MPA degree students who have presented a satisfactory Independent Study proposal to their review committee at the conclusion of the previous fall semester. Prerequisite: POLS 997. S.


POL 997. Independent Study. 3 Credits.
Seminar course that assists students in the process of developing, researching, composing, and presenting an Independent Study or Policy Paper on a public administration or public policy topic of their choosing, in consultation with one or more faculty advisors. Focused on familiarizing students with the craft of research writing and presentation and enabling them to communicate these findings clearly and effectively to a variety of audiences, orally and in writing. At the conclusion of the course, students will have completed and formally presented a full Policy Paper proposal and will have submitted a plan and timeline for project completion. Prerequisites: POLS 500 and POLS 501 or instructor consent; may be repeated once with approval of MPA Program Director if student received a grade of D or F for the course. Repeatable to 3 credits. F.

POL 998. Thesis. 1-4 Credits.

Undergraduate Courses for Graduate Credit

POL 404. Urban Politics and Administration. 3 Credits.
Analysis of the socio-economic context of urban America and its impact on politics, policy, and administration. Prerequisite: POLS 115. S.

B.S.P.A./M.P.A. Combined Degree

The Public Administration program offers two options for exceptional undergraduate students wishing to pursue Masters-level work: the Combined Bachelor to Masters Program (CBM) and the Accelerated Bachelor to Masters Program (ABM). The intent of the combined programs are to allow qualified students to complete the requirements for both degrees in one year beyond that required to receive the baccalaureate degree. Students may apply for these programs upon completion of 60 credits toward the Bachelor’s degree but prior to their fourth year of academic work. All requirements for both degrees must be met. Up to six credits of prior-approved coursework may be double counted under the CBM program, and up to twelve credits of prior-approved coursework may be double-counted under the ABM program. Double-counted credits may not include required courses for the BSPA or BA degree, but may include appropriate elective coursework, preferably at the 500-level or above.

CBM 5 Year Degree Admission Requirements

The Combined Bachelor’s/Master’s (CBM) program allows undergraduate students at UND an opportunity to complete the requirements for both the bachelor’s and master’s degrees at an accelerated pace. These students may double count up to 12 graduate-level credits towards the requirements for both their Bachelor in Political Science or Public Affairs and their Master of Public Administration (MPA) degree requirements. ABM students must obtain their MPA degree within 12 months of completing the Bachelor’s degree, provided that the degree requirements can be completed in that timeframe.

High achieving high school students (GPA of at least 3.5/4.0 and an ACT score of 25 or higher) will initially be considered for “identified” status and become eligible for formal admission when they meet the same criteria that undergraduates must meet for admission into the ABM program. Admission is a competitive process. The following are minimum eligibility requirements:

1. Students must meet the School of Graduate Studies admissions eligibility requirements.
2. Students must have completed a minimum of 60 credits, including credits earned from advanced placement and dual credit. Students must apply before completion of the undergraduate degree.
3. Transfer students with a minimum of 60 credits-whether from the transfer institution alone or in combination with UND credits-must have a minimum cumulative GPA of 3.0/4.0 at the time of admission to the ABM program.
4. Students must have a minimum cumulative GPA of 3.0/4.0 at UND at the time of admission into the ABM program.
5. ABM program applicants must submit the standard application to the School of Graduate Studies, the application fee, a personal statement, 3 letters of recommendation, and transcripts.
6. Graduate Record Examination general test scores for review. The GRE requirement may be waived at the discretion of the MPA Program Director in accordance with program criteria. The decision of the MPA Program Director is final.
7. Additionally, ABM program applicants must submit a detailed Program Study that describes the 12 credits of double counted courses, the courses that will be taken after being accepted into the MPA program, the courses that will be taken before graduation from the BS/BA program, and the expected graduation date for each degree. The submitted program of study must be signed by the student, the student’s undergraduate advisor, the student’s graduate advisor, and the MPA Program Director.

Degree Requirements

1. A minimum of 36 semester credits (6 CBM) or 12 (ABM) credits may be part of undergraduate degree program but taken for graduate credit.
2. A minimum of 27 credits in public administration and up to 9 credits in cognate fields to total 36 credits.
3. At least one-half must be at the 500-level.
4. A maximum of 9 credits may be transferred to UND from other institutions.

<table>
<thead>
<tr>
<th>Fundamentals of Public Speaking</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 110</td>
<td>College Composition I</td>
</tr>
<tr>
<td>MATH 103</td>
<td>College Algebra</td>
</tr>
<tr>
<td>POLS 115 or POLS 116</td>
<td>American Government I or State and Local Government</td>
</tr>
<tr>
<td>POLS 120</td>
<td>Global Perspectives</td>
</tr>
<tr>
<td>Essential Studies: Lab Science</td>
<td>3</td>
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</table>

<table>
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<tr>
<th>Second Semester</th>
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</thead>
<tbody>
<tr>
<td>COMM 110</td>
</tr>
<tr>
<td>ENGL 130</td>
</tr>
</tbody>
</table>
### Certificate in Health Administration

The health administration certificate program is designed to prepare people with diverse backgrounds already in the health care industry or those wishing to enter the fast growing and rapidly changing health care profession. Students admitted to the certificate program are required to complete four of the three-credit courses (12 credits total) listed below, and are required to maintain a 3.0 GPA in order to remain in the program.

#### Courses:

<table>
<thead>
<tr>
<th>Required Courses (6 credit hours)</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>POLS 551 Health Administration and Organization</td>
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<tr>
<td>POLS 552 Health Policy</td>
<td>3</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Elective Courses (6 credit hours)</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>POLS 537 Program Evaluation</td>
<td>3</td>
</tr>
<tr>
<td>ECON 575 Advanced Special Topics</td>
<td>3</td>
</tr>
<tr>
<td>MPH 504 Planning and Management to Promote Health</td>
<td>3</td>
</tr>
</tbody>
</table>

* Also offered as POLS 593 Problems in Political Science and Public Administration: Leading and Managing Public Health Systems

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### Certificate in Policy Analysis

This program seeks to provide the analytic skills needed by professionals from many academic backgrounds who are required to do or understand policy analysis and program planning in the public and not-for-profit sectors. Even managers who do not do research themselves must understand the work of others if they are to make informed decisions based on the information provided in research reports.

Students admitted to the certificate program are required to complete four of the three-credit courses (12 credits total) listed below, and are required to maintain a 3.0 GPA in order to remain in the program.

#### Required Courses

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<tr>
<th>Credits</th>
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<table>
<thead>
<tr>
<th>Elective Courses (3 credit hours)</th>
<th>Credits</th>
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<tbody>
<tr>
<td>POLS 502 Problems in State and Local Governments</td>
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</tr>
<tr>
<td>POLS 508 Legislative and Executive Processes</td>
<td>3</td>
</tr>
<tr>
<td>POLS 537 Program Evaluation</td>
<td>3</td>
</tr>
<tr>
<td>POLS 538 Public Budgeting and Financial Administration</td>
<td>3</td>
</tr>
<tr>
<td>POLS 552 Health Policy</td>
<td>3</td>
</tr>
<tr>
<td>POLS 593 Problems in Political Science and Public Administration</td>
<td>3</td>
</tr>
</tbody>
</table>

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### Certificate in Public Administration

This program seeks to provide the management core needed by professionals from many academic backgrounds who have risen to positions of authority in the public and not-for-profit sector without benefit of formal management training.

Students admitted to the certificate program are required to complete four of the three-credit courses (12 credits total) listed below, and are required to maintain a 3.0 GPA in order to remain in the program.

#### Required Courses

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<tr>
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<tr>
<th>Elective Courses or Track Electives</th>
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<tr>
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<td>POLS 552 Health Policy</td>
<td>3</td>
</tr>
<tr>
<td>POLS 593 Problems in Political Science and Public Administration</td>
<td>3</td>
</tr>
</tbody>
</table>

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### Certificate in Policy Analysis

This program seeks to provide the analytic skills needed by professionals from many academic backgrounds who are required to do or understand policy analysis and program planning in the public and not-for-profit sectors. Even managers who do not do research themselves must understand the work of others if they are to make informed decisions based on the information provided in research reports.

Students admitted to the certificate program are required to complete four of the three-credit courses (12 credits total) listed below, and are required to maintain a 3.0 GPA in order to remain in the program.

#### Required Courses

<table>
<thead>
<tr>
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<tr>
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<td>3</td>
</tr>
<tr>
<td>POLS 593 Problems in Political Science and Public Administration</td>
<td>3</td>
</tr>
</tbody>
</table>
Admission Requirements

Degree Administration/Juris Doctor

Combined Master of Public Administration/Juris Doctor Degree

Admission Requirements

1. Students are required to apply to both the Law School and the School of Graduate Studies and indicate that they wish to be admitted to the joint MPA/JD track. This admission will be determined by the Director of the M.P.A. Program and the Dean of the School of Graduate Studies.

2. Acceptance to the joint program track requires a minimum overall undergraduate GPA of 3.00 or a GPA of 3.25 in the last two academic years.

Certificate in Social Entrepreneurship

This certificate program seeks to provide individuals with diverse educational and professional backgrounds, an interdisciplinary core of knowledge necessary to craft, manage, and act within innovative business and nonprofit enterprises that address social needs, create public value, and achieve social change.

Admission Requirements

1. Students must hold a baccalaureate degree from an educational institution of recognized standing, as determined by the School of Graduate Studies.

2. Minimum cumulative undergraduate GPA of 2.75 or higher.

3. International students must meet the English language and other admission requirements of the University of North Dakota.

4. Students must submit an admission portfolio containing:
   a. A personal statement addressing how the certificate will help them meet their goals
   b. Official transcripts of all coursework completed
   c. Three (3) letters of reference
   d. A description of relevant work experience

Students should note that the above requirements represent minimum achievement levels necessary to be considered for admission; meeting these requirements does not guarantee admission.

Certificate Requirements

Students admitted to the certificate program are required to complete the four three-credit courses (12 credits total) listed below, and are required to maintain a 3.0 GPA in these four courses in order to remain in the program.

<table>
<thead>
<tr>
<th>Required Courses</th>
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</thead>
<tbody>
<tr>
<td>POLS 531 Foundations of Public Administration</td>
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<tr>
<td>POLS 535 Public Organizations</td>
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</table>

<table>
<thead>
<tr>
<th>Elective Courses (6 credit hours)</th>
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</thead>
<tbody>
<tr>
<td>POLS 502 Problems in State and Local Governments</td>
</tr>
<tr>
<td>POLS 508 Legislative and Executive Processes</td>
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<tr>
<td>POLS 532 Public Policy</td>
</tr>
<tr>
<td>POLS 533 Administrative Ethics in the Public Sector</td>
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<tr>
<td>POLS 536 Public Personnel Administration</td>
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<tr>
<td>POLS 538 Public Budgeting and Financial Administration</td>
</tr>
<tr>
<td>POLS 539 Administrative Law</td>
</tr>
<tr>
<td>POLS 593 Problems in Political Science and Public Administration</td>
</tr>
</tbody>
</table>

Joint MPA/JD Complementary Courses

Law

| Year One | Law School |
|----------------------------------|
| LAW 150 |
| LAW 201 |
| LAW 203 |
| LAW 206 |
| LAW 210 |
| LAW 238 |
| LAW 263 |
| LAW 277 |
| LAW 281 |
| LAW 289 |
| LAW 291 (Poverty Law) |
| LAW 291 (Civil Rights) |
| LAW 291 (State Constitutional Law) |

* Or other courses with the approval of the MPA Director and Graduate Dean

Political Science and Public Administration

| Year Two | Law School w/two MPA courses |
|----------------------------------|
| POLS 502 Problems in State and Local Governments |
| POLS 508 Legislative and Executive Processes |
| POLS 531 Foundations of Public Administration |
| POLS 532 Public Policy |
| POLS 535 Public Organizations |
| POLS 536 Public Personnel Administration |
| POLS 538 Public Budgeting and Financial Administration |
| POLS 539 Administrative Law |

* Or other courses with the approval of the Dean of the Law School

Sample Curricular Plan

| Year One | Law School |
|----------------------------------|
| LAW 150 |
| LAW 201 |
| LAW 203 |
| LAW 206 |
| LAW 210 |
| LAW 238 |
| LAW 263 |
| LAW 277 |
| LAW 281 |
| LAW 289 |
| LAW 291 (Poverty Law) |
| LAW 291 (Civil Rights) |
| LAW 291 (State Constitutional Law) |

* 2 MPA course requirements could be met with law courses as cognates.

Six credits (approved by the Law School) from the MPA Program will count toward the Law Degree. Six of the 36 required credits in the MPA program can be law courses used as a cognate for the MPA degree (with the approval of the department and the Dean of the School of Graduate Studies). The total credits required for each degree will be unchanged, because each program will accept six credits toward the other degree. This will save the student one semester (12 credits) and make the program more appealing.

Normally, the joint program will be completed in four years. With summer school classes it may be possible to obtain both degrees even more quickly. Students must be enrolled in the Law School for at least three years; therefore, students wishing to receive both degrees in less than four years should enroll first in the Law School.

Below is a list of Law School courses that can be used as cognates in the MPA program, and MPA courses that can be used as electives in the JD program.

Master of Public Administration

Admission Requirements

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.
1. A four-year bachelor’s degree from a recognized college or university.
2. A cumulative Grade Point Average (GPA) of at least 2.75 for all undergraduate work or a GPA of at least 3.0 for the junior and senior years of undergraduate work (based on A=4.00).
3. Graduate Record Examination (GRE) general test scores submitted for review. The GRE requirement may be waived at the discretion of the MPA Program Director in accordance with program criteria. The decision of the MPA Program Director is final.
4. A satisfactory score on the Test of English as a Foreign Language (TOEFL). For the internet-based TOEFL (TOEFL iBT) an overall score of 79 is required.
5. Minimum competence in public administration, administrative sciences, and methodology. This competence is normally demonstrated by at least one course in each of four fields (Political Science, Accounting, Economics, and Statistics), by special exams in the fields, or by practical experience. Accounting, Economics, and Statistics competencies may be met through the successful completion of self-paced boot camp courses on these topics from Ivy Software (http://ivysoftware.com).
6. Twenty credit hours in the social sciences, business administration, and related fields.
7. Students who do not meet requirements, 5 and 6, will be given the opportunity to fulfill them.

Degree Requirements

Students seeking the Master degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Master of Public Administration Program.

1. A minimum of 36 semester credits.
2. A minimum of 27 credits in public administration and up to 9 credits in cognate fields to total 36 credits.
3. At least one-half of the credits must be at the 500 level.
4. A maximum of nine credits may be transferred to UND from other institutions.

5. Required Courses:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>POLS 500</td>
<td>Research Methods</td>
<td>3</td>
</tr>
<tr>
<td>POLS 501</td>
<td>Political and Public Policy Analysis</td>
<td>3</td>
</tr>
<tr>
<td>POLS 531</td>
<td>Foundations of Public Administration</td>
<td>3</td>
</tr>
<tr>
<td>POLS 532</td>
<td>Public Policy</td>
<td>3</td>
</tr>
<tr>
<td>POLS 570</td>
<td>MPA Capstone</td>
<td>3</td>
</tr>
<tr>
<td>POLS 580</td>
<td>Administrative Internship</td>
<td>3</td>
</tr>
<tr>
<td>General, Health Administration, or Social Entrepreneurship Track</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>POLS Electives or cognate/elective courses</td>
<td>9</td>
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</tbody>
</table>

Total Credits: 36

Students with a minimum of one year relevant administrative experience may petition the Graduate Program Director to have requirement waived and to substitute a 3-credit elective in its place.

6. General Track

Select a total of 9 credits from the following list. Up to 6 credit hours of POLS 593 may be applied to the degree with consent of the MPA Program Director.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>POLS 502</td>
<td>Problems in State and Local Governments</td>
<td></td>
</tr>
<tr>
<td>POLS 503</td>
<td>Government and Business</td>
<td></td>
</tr>
<tr>
<td>POLS 533</td>
<td>Administrative Ethics in the Public Sector</td>
<td></td>
</tr>
<tr>
<td>POLS 535</td>
<td>Public Organizations</td>
<td></td>
</tr>
<tr>
<td>POLS 536</td>
<td>Public Personnel Administration</td>
<td></td>
</tr>
<tr>
<td>POLS 537</td>
<td>Program Evaluation</td>
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<td>POLS 538</td>
<td>Public Budgeting and Financial Administration</td>
<td></td>
</tr>
<tr>
<td>POLS 539</td>
<td>Administrative Law</td>
<td></td>
</tr>
<tr>
<td>POLS 562</td>
<td>Political Advocacy and Social Entrepreneurship</td>
<td></td>
</tr>
<tr>
<td>POLS 593</td>
<td>Problems in Political Science and Public Administration</td>
<td></td>
</tr>
</tbody>
</table>

Health Administration Track

Select a total of 9 credits from the following list.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>POLS 551</td>
<td>Health Administration and Organization</td>
</tr>
<tr>
<td>POLS 552</td>
<td>Health Policy</td>
</tr>
<tr>
<td>ECON 575</td>
<td>Advanced Special Topics</td>
</tr>
<tr>
<td>MPH 504</td>
<td>Planning and Management to Promote Health</td>
</tr>
</tbody>
</table>

Social Entrepreneurship Track

Select a total of 9 credits from the following list.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>POLS 561</td>
<td>Creation and Management of Social Enterprises</td>
</tr>
<tr>
<td>POLS 562</td>
<td>Political Advocacy and Social Entrepreneurship</td>
</tr>
<tr>
<td>ENTR 575</td>
<td>Special Topics (Sustainability)</td>
</tr>
<tr>
<td>ENTR 580</td>
<td>Seminar in Social Entrepreneurship</td>
</tr>
</tbody>
</table>

* Also offered as POLS 593 Problems in Political Science and Public Administration

Residence Requirement

There is no residence requirement for the M.P.A. degree; however, at least one-half of the credits for the degree must be taken on campus or as an admitted distance degree student.

Candidacy for the Degree

Admission of a student to the School of Graduate Studies as a degree student in Approved Status implies only that the student has met minimum entrance requirements and will be permitted to take graduate courses, which normally may be expected to lead to a degree. The student has not been admitted as a candidate for a degree. Advancement to candidacy can be granted only after the student has met certain academic requirements in approximately the following sequence:

1. Completion of 12 semester credits.
2. A GPA of at least 3.00 for all work attempted.
3. The appointment of an advisor. The advisor, who must be a member of the Graduate Faculty, will be appointed by the Dean upon the written recommendation of the M.P.A. program director. The advisor is responsible to the department and the School of Graduate Studies for the supervision of the student’s work.
4. Approval of a Program of Study on a form available from the School of Graduate Studies. The program, which should be developed in consultation with the advisor, must carry the signature of the student, the advisor, and the program director and must be submitted to the Dean of the School of Graduate Studies for approval.
5. Completion of the MPA Capstone course with a grade of a B or better.

The student and the advisor will be notified in writing of the advancement to candidacy. Students must complete all requirements for advancement to candidacy prior to the semester in which they plan to graduate.

Public Health

Master of Public Health (p. 539)

Accelerated Bachelor in Public Health Education/Master of Public Health (http://und-public.courseleaf.com/graduateacademicinformation/departmentalcoursesprograms/publichealth/accel)

Certificate in Public Health (p. 539)

Courses

MPH 504. Planning and Management to Promote Health. 3 Credits. This course introduces students to the field of public health and develops their appreciation of the unique and important role of public health in promoting health and preventing disease and disability in communities and populations; their understanding of the principles of population health; and their knowledge of how public health functions today, including its organization, financing, policy priorities, and core functions in the United States and other countries. Prerequisite: Enrollment in MPH degree program or certificate. On demand.
MPH 505. Public Health Data Management in SAS. 1 Credit.
This course introduces students to the basics of data management using the statistical software SAS. The course emphasizes management and manipulation of large data sets using the active learning approach. Students need to bring their laptop computers to class, as well as a flash drive on which to store SAS programs and data sets. Data for exemplification will be chosen from the large array of online and publicly available health-related data sets. Prerequisite: Enrollment in MPH degree program or certificate. On demand.

MPH 506. Public Health Data Management in R. 1 Credit.
This course introduces students to the basics of data management using the statistical software R. The course emphasizes management and manipulation of large data sets using the active learning approach. Students need to bring their laptop computers to class, as well as a flash drive on which to store R programs and data sets. Data for exemplification will be chosen from the large array of online and publicly available health-related data sets. Prerequisite: Enrollment in MPH degree program or certificate. On demand.

MPH 510. Public Health & Health Care Systems. 2 Credits.
This course provides an overview of the U.S. public health and health care systems as well as current health policy issues. Topics are addressed from a comparative effectiveness perspective and evaluate how U.S. health systems perform relative to other countries and systems. Prerequisite: Enrollment in MPH degree program or certificate. On demand.

MPH 520. Environmental Health. 2 Credits.
This course introduces the key concepts, principles, and applications of the primary science disciplines that underpin environmental health. It provides an overview of the major pollutants including their detection, impact on health, and principles of remediation. Ethical issues related to environmental health are discussed. Prerequisite: Enrollment in MPH degree program or certificate. On demand.

MPH 531. Biostatistics 1. 3 Credits.
This MPH Core course introduces the selection, use, and interpretation of basic statistical tests and concepts that may be used in addressing, analyzing, and solving problems in public health and health care research. Prerequisite: Enrollment in MPH degree program or certificate. On demand.

MPH 532. Biostatistics 2. 3 Credits.
This course continues the introduction to biostatistics begun in MPH 531 on the selection, use, and interpretation of basic statistical tests and concepts that may be used in addressing, analyzing, and solving problems in public health and health care research. Topics include multiple linear regression, analysis of variance as a special case of multiple linear regression, and an introduction to logistic regression. Prerequisite: MPH 531. F.S.SS.

MPH 533. Advanced Biostatistics. 3 Credits.
This course develops advanced skills in biostatistics, with an emphasis on applied research in public health and medicine. Students learn how to derive quantitative answers to an applied research question by using multivariate statistical modeling. The course covers advanced topics in analysis of variance, linear and logistic regression, survival analysis, and generalized linear models. Prerequisites: MPH 532 and MPH 550. F.S.SS.

MPH 534. Bioinformatics. 3 Credits.
This course introduces bioinformatics techniques and tools in analysis of various types of high-throughput biomedical data, such as microarray, genotyping and next-generation sequencing data. Students will learn the essential principles of conducting genomics research, and gain hands-on experience of bioinformatics research using real research data. The advanced bioinformatics methods, such as data mining, graph theory, and high performance computing, are discussed. Prerequisite: Permission of Instructor. On demand.

MPH 535. Health Care Data Mining. 3 Credits.
This course covers data mining concepts and methods that are important for health informatics. Basic topics in clustering and classification, such as hierarchical clustering, logistic discrimination, decision tree, variable selection, Bayesian decision model, and others are introduced. Students learn the techniques of data mining from an applications perspective. Students will have access to large healthcare datasets in a local server computer and have hands-on experience using data mining software. Prerequisite: Permission of Instructor. On demand.

MPH 538. Introduction to Structural Equation Analysis. 3 Credits.
This course provides (a) introductory coverage of confirmatory latent variable techniques, including confirmatory factor analysis and structural equation methods; (b) in-depth presentation of special issues related to the application of these techniques in social science-based research; and (c) a comparison of these techniques with traditional analytical approaches. Prerequisite: Graduate statistics course with knowledge of linear multiple regression. On demand.

MPH 541. Public Health Communication. 2 Credits.
This is a two credit hour course designed to provide students with a critical understanding of the effects of the media-mass, social, and participatory-in promoting and impeding the achievement of public health goals. This course introduces social and behavioral sciences theories, methods that are applied to public health problems, and how public health principles are communicated. Students will develop the skills necessary to use media strategically to advance public health policies and social change. The course covers the design, implementation and evaluation of media campaigns to promote public health goals, examines theories and research on media influences with respect to its potential harmful effects on wellbeing, and students design a health communication campaign. Prerequisite: Enrollment in MPH degree program or certificate. On demand.

MPH 544. Leadership of Health Care Organizations. 3 Credits.
Leaders of health care organizations can promote or inhibit optimum performance and desirable change. Students learn how to analyze and assess leadership qualities through application of leadership theories, methods, and techniques. Topics include leadership versus management, leading organizational change, dealing with workforce and organizational challenges, and related subjects. Prerequisite: MPH major or instructor consent. On demand.

MPH 545. Public Health Leadership & Interprofessional Practice. 3 Credits.
This is a three credit hour course designed to introduce students to major theories and concepts of leadership, ways of applying these to public health issues requiring leadership, and provides an opportunity for students to develop skills and resources for further developing leadership skills. The course focuses on preparing healthcare professionals with the foundational skills needed to work in teams to effectively collaborate and coordinate services in population health management. Key themes focused on interprofessional communication, collaboration, leadership, and professionalism will be ingrained throughout content. Prerequisite: Admission into MPH Program or prior approval from instructor. On demand.

MPH 550. Population Health Research Methods. 3 Credits.
This course provides an overview of the research process including formulation of a research problem, selection of a research design, construction of an instrument for data collection, selection of a sample, collection and processing of data, and writing a research report. Topics include how to identify a research question; reasons and procedures for reviewing the literature; observational and interventional research designs; and commonly used measures in public health-related research. Prerequisites: MPH 531. On demand.

MPH 551. Epidemiology. 3 Credits.
This course introduces the basic epidemiologic concepts used to study health and disease in populations including measurement, study design, and related statistical tests. Observational and experimental epidemiologic studies are described and their advantages and disadvantages compared. The course provides an overview of the major causes of morbidity and mortality in populations. Ethical issues related to epidemiology are discussed. Prerequisite: Enrollment in MPH degree program or certificate. On demand.

MPH 552. Epidemiology 2. 3 Credits.
This is a three credit hour course designed to provide students with a critical understanding of intermediate epidemiological principles. This second course of epidemiology is a continuation of the MPH 551 Epidemiology course which introduced basic epidemiology concepts to the students. MPH 552 (Epidemiology 2) covers methods and techniques for designing, implementing, analyzing and interpreting observational studies, including cross-sectional, case-control and cohort studies. Prerequisites: MPH 531 and MPH 551. On demand.
MPH 553. Population Health Outcomes Research. 3 Credits.
This course is designed to give students hands-on-experience analyzing existing health data - administrative claims, electronic medical records, and patient surveys - to evaluate health outcomes. Students develop analytic expertise and gain practical experience creating common outcome measures including utilization of health services such as office visits, visits to primary care providers, hospitalizations, and emergency room visits and their associated costs. Other outcome measures include general health and functional status, behavioral health problems such as depression, and quality of life. Common methodological issues associated with analyzing these data such as matching, risk adjustment, and selection bias are discussed. Prerequisite: Completion of MPH core courses or consent of instructor. On demand.

MPH 554. Continuous Quality Improvement for Health Care Organizations. 3 Credits.
This course provides a detailed view of quality improvement techniques, methods, and evaluation in health care organizations. The knowledge gained from these quality improvement methods enable students to identify, address, analyze, and solve organizational quality shortcomings with the ultimate goal of improving healthcare quality. Topics include quality assessment, quality assurance, total quality management, continuous quality improvement, health care reform related to quality improvement, patient safety, and quality health outcomes. Prerequisites: MPH 510 and MPH major or instructor consent. On demand.

MPH 555. Health Law & Policy Analysis. 3 Credits.
The U.S. health system is undergoing significant transformation, and public health has a critical role at the federal, regional, state, and local levels. Students will learn advanced skills in applied health policy including: evaluating proposed legislation and reform; researching health legislation (e.g., Public Health Service Act, Social Security Act, Affordable Care Act); understanding the rulemaking process at state and federal agency levels once laws are enacted; conducting literature reviews; analyzing the evidence base for public health policy interventions; writing brief summaries of proposed legislation; giving testimony to inform health policy decisions; summarizing the pros and cons of health policy interventions; and identifying potential opponents, proponents, advocates, and stakeholders related to specific health law policy issues and interventions. Prerequisite: POLS 552. On demand.

MPH 556. System Dynamics 1. 3 Credits.
This course provides an introduction to the System Dynamics field of study which is a computer-aided approach to improving system performance through policy analysis and design. The knowledge and critical thinking skills gained from this course will enable students to work either independently or on interdisciplinary teams to effectively deal with problems arising from dynamically complex systems. Topics include: perspective and process; tools for systems thinking; the dynamics of growth; tools for modeling dynamic systems; instability and oscillation; model testing; and challenges for the future. This course is open to UND graduate students in all disciplines. On demand.

MPH 557. Special Topics in Population Health. 1-3 Credits.
This course explores special topics in the field of population health. Topics vary with faculty expertise and issues current in the field. The course may be repeated for credit if the topics are different. Prerequisite: Approval of Faculty Advisor. Repeatable to 6 credits. F.S.S.

MPH 572. Health Care Budgeting and Finance. 3 Credits.
This course focuses on learning and applying financial and managerial accounting principles and techniques to health services organizations. The subject matter is designed to provide a working knowledge of accounting, finance, and budget terminology. Components of the class include the evolution of healthcare finance and reimbursement; revenue and expense classification; financial reporting, budgeting, financial analysis, financing of public health agencies, and the current and anticipated financial impact of healthcare reform on the healthcare industry and health services organizations. Prerequisite: MPH major or instructor consent. On demand.

MPH 574. Foundations of Health Economics. 3 Credits.
This course serves as an introduction to the role of economics in health care and health policy. The microeconomic principles of supply and demand are introduced, and topics such as the demand for health, the derived demand for medical care, and the demand for health insurance are covered. On the supply side, the course examines the supply of medical care by physicians and hospitals, medical technology, and the role of the managed care organizations. Implications of adverse selection, moral hazard, externalities, and asymmetric information are addressed. Cost benefit and cost effectiveness analyses are also introduced. The course examines the role of government in health care and health care reform including the implications of expanding insurance coverage under the Affordable Care Act. The effectiveness and efficiency of various health policies are also addressed, including government forms of insurance coverage such as Medicare, Medicaid, and the Department of Veterans’ Affairs, price regulation of hospitals, provider payment reform, medical malpractice, uncompensated care, and health care workforce issues. Prerequisite: College Algebra and one of the following: Basic Statistics or Biostatistics, Introductory Micro- or Macro- Economics; or Consent of Instructor. On demand.

MPH 581. Principles of Indigenous Health. 3 Credits.
This is a three credit hour course designed to provide students with a critical understanding of determinants of Indigenous health and health disparities. In this course we will define Indigenous populations, histories, cultures, societies, traditional healing systems, food sources, patterns and impact of colonization, and health disparities. We will address historical and ongoing traumas associated with colonization and colonialism, understanding Indigenous concepts of health and healing, and ways of moving toward health equity. Populations we will assess include American Indian/Alaska Native, First Nations, Inuit, Sámi, Aboriginal Australian, Maori, Ainu, and Pacific Islanders. Prerequisite: Admission into MPH Program or permission from the instructor. On demand.

MPH 582. Social & Ecological Determinants of Indigenous Health. 3 Credits.
This is a three credit hour course designed to provide students with the skillsets to apply the Social-Ecological Model to Indigenous Health through an Indigenous lens. Key concepts and determinants of health will include: Social determinants of Indigenous Health, Indigenous environmental health and environmental justice, Impact of discrimination and marginalization of Indigenous populations, Social and Ecological case studies. Prerequisite: Admission into MPH Program or prior approval of instructor. On demand.

MPH 583. American Indian Health Policy. 3 Credits.
The American Indian (AI) population is unique in the United States in that AIs are born with a legal right to health services. This is based on treaties and numerous other laws, executive orders, court decisions and other legal bases in which the tribes exchanged land and other natural resources for various social services, including housing, education, and healthcare. The Indian Health Service (IHS) is the federal agency responsible for carrying out the federal government’s trust responsibility to provide public health and healthcare services to AIs. Prerequisite: Admission into MPH Program or prior approval from instructor. On demand.

MPH 584. Public Health Programming in Indigenous Populations. 3 Credits.
This is a three credit hour course designed to provide students with the knowledge and strategies needed to develop and implement effective public health programs in Indigenous populations to address significant public health disparities. Key areas of focus include: Applying the Ten Essential Public Health Services in Indigenous Populations, Indigenous Research Program Evaluation Frameworks, Grant writing and management, Funding sources for Indigenous Public Health programming, Case Studies/Best and Promising Practices in Indigenous Public Health. Prerequisite: Admission into MPH Program or prior approval from instructor. On demand.

MPH 590. MPH Seminar in Leadership and Advocacy. 1 Credit.
The MPH Seminar is one component of the MPH Culminating Experience, and enrollment is concurrent with MPH 995. Presentations, discussions, and activities focus on developing knowledge and skills that prepare students to be effective public health leaders and advocates. Prerequisite: Complete all MPH core courses. Corequisite: MPH 995. On demand.
**MPH 594. Practicum. 1-3 Credits.**
The Practicum is a planned, supervised, and evaluated practice experience. It provides an opportunity to apply basic public health competencies acquired through coursework. The Practicum is a group experience designed to meet MPH curricular goals and the needs of participating Practicum organizations. Prerequisites: Enrollment in MPH degree program, completion of core courses and consent of instructor. Repeatable to 3 credits. On demand.

**MPH 596. Public Health Internship. 6-24 Credits.**
The internship is a professional experience in an approved public health-related agency or organization. An internship is optional for MPH students, and can be paid or unpaid. It does not replace the 42-credit required coursework for the MPH degree but is an additional training experience, which would be undertaken when most or all MPH coursework is complete. Prerequisite: Approval of MPH program director. Repeatable to 24 credits. S/U grading. On demand.

**MPH 995. Integrative Learning Experience. 2 Credits.**
The Scholarly Project is one component of the MPH Culminating Experience, and enrollment is concurrent with MPH 590. Students complete a project that demonstrates synthesis and application of knowledge acquired through coursework and other public health learning experiences. Prerequisite: Complete all MPH core courses or instructor permission. Corequisite: MPH 590. F.S.S.

**MPH 996. Continuing Enrollment. 1-12 Credits.**
Repeatable. S/U grading.

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**Graduate Certificate in Public Health**
The Graduate Certificate in Public Health is offered as part of the MPH Program. It is designed for people who wish to obtain formal training in public health, but do not want to earn the MPH degree. These include people currently working in the public health and health care fields, as well as others. The Graduate Certificate in Public Health requires completion of 15 credits. Students may earn the certificate in one of two emphases: General Public Health or Population Health Analytics. Each emphasis requires completion of 15 credits, and both require biostatistics and epidemiology. In addition to these two common courses, the General Public Health emphasis requires 3 other MPH core courses, and the Population Health Analytics focus requires research methods and two analytics electives. Applicants must meet all admissions requirements of the MPH Program except completion of a standardized test. All credits from the certificate program can be transferred into the MPH Program, if the student wishes. In addition, some students who complete the Graduate Certificate in Public Health will be eligible to sit for the Certified in Public Health (CPH) examination. For more information and CPH requirements visit: https://www.nbphp.org.

**Area of Emphasis: General Public Health**
The following courses are required for the General Public Health emphasis in the Graduate Certificate in Public Health.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MPH 510</td>
<td>Public Health &amp; Health Care Systems</td>
<td>3</td>
</tr>
<tr>
<td>MPH 531</td>
<td>Biostatistics 1</td>
<td>3</td>
</tr>
<tr>
<td>MPH 590</td>
<td>MPH Seminar in Leadership and Advocacy</td>
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</tr>
<tr>
<td>POLS 552</td>
<td>Health Policy</td>
<td>3</td>
</tr>
<tr>
<td>MPH 541</td>
<td>Public Health Communication</td>
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</tr>
<tr>
<td>MPH 551</td>
<td>Epidemiology</td>
<td>3</td>
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</tbody>
</table>

**Area of Emphasis: Population Health Analytics**
The following courses are required for the Population Health Analytics emphasis in the Graduate Certificate in Public Health.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPH 531</td>
<td>Biostatistics 1</td>
<td>3</td>
</tr>
<tr>
<td>MPH 550</td>
<td>Population Health Research Methods</td>
<td>3</td>
</tr>
<tr>
<td>MPH 551</td>
<td>Epidemiology</td>
<td>3</td>
</tr>
<tr>
<td>MPH 505</td>
<td>Public Health Data Management in SAS</td>
<td>1</td>
</tr>
<tr>
<td>MPH 506</td>
<td>Public Health Data Management in R</td>
<td>1</td>
</tr>
</tbody>
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**Master of Public Health**

**Admission Requirements**

1. Completion of the online application and payment of the application fee.
2. A baccalaureate degree or equivalent from an accredited college or university (for U.S. degrees, accreditation by one of the six regional accrediting associations: MSA, NASC, NCA, NEASC-CHE, SACS-CC or WACS-Sr.).
3. An undergraduate and graduate (if applicable) cumulative grade point average (GPA) of at least 3.00.
4. A standardized test.* One of the following tests is required: Graduate Record Examination (GRE) General Test, Medical College Admission Test (MCAT), Graduate Management Admission Test (GMAT), Dental Admission Test (DAT), or Law School Admission Test (LSAT). There is no minimum score required for admission. Scores are used in combination with other indicators to determine eligibility for the MPH program. Standardized test scores must be sent by the testing service directly to UND. The institution code for the UND is 6878.
   a. *A standardized test is not required of applicants who have completed an advanced degree (Master’s degree or higher) in a graduate program at an accredited U.S. or Canadian institution of higher learning.
   b. *A standardized test is not required of applicants who have a minimum of five years of relevant experience in public health that demonstrates ability to engage in graduate level coursework in the field of public health. Please contact the MPH Program Manager for more information.
5. Fluency in written and spoken English. All non-native speakers of English must meet the School of Graduate Studies requirements regarding fluency in written and spoken English. Please refer to the School of Graduate Studies website (http://graduateschool.und.edu/graduate-students/new/admissions-international.cfm#language-proficiency).

Applicants are required to submit the following supporting documentation:

1. A written statement that describes the applicant’s professional goals and motivation for seeking a degree in public health. In addition, applicants should comment on any personal qualities, characteristics, and abilities they believe will enable them to be successful in achieving their career goals.
2. Resume listing work experience, including voluntary, and relevant accomplishments, awards, and honors.
3. Official post-secondary academic transcripts from all institutions attended. Transcripts must be sent directly from the institutions to the UND School of Graduate Studies.
4. Three (3) letters of recommendation from individuals who the applicant feels are most qualified to evaluate their academic potential and leadership potential in public health.

The Admissions Committee may request an in-person or Skype interview with an applicant to assist in the decision process. A background check will be completed on each student before admission is final.

**Program Requirements**
The MPH program requires the successful completion of at least 42 credits of coursework. The MPH Core curriculum covers all competencies and areas of foundational knowledge required for public health programs accredited by the Council on Education for Public Health (CEPH). The MPH program also requires completion of an 12 credit specialization in Population Health Research & Analytics, Indigenous Health, or Health Management & Policy; a 3 credit Practicum; and a 3 credit Integrative Learning Experience. The core curriculum and the specialization curricula in Indigenous Health and Health Management & Policy are available online, and the specialization curriculum in Population Health Research & Analytics is available in-person and through distance education/interactive video network.
Degree Requirements

Students seeking the Master of Public Health degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Master of Public Health Program.

Coursework

Required MPH Core Coursework (21 credits):

- MPH 531 Biostatistics 1: 3
- MPH 551 Epidemiology: 3
- MPH 541 Public Health Communication: 2
- MPH 510 Public Health & Health Care Systems: 2
- MPH 504 Planning and Management to Promote Health: 3
- POLS 552 Health Policy: 3
- MPH 520 Environmental Health: 2
- MPH 545 Public Health Leadership & Interprofessional Practice: 3

MPH Practice Experience

MPH 594 Practicum, 3 credits

The Practicum is a planned, supervised, and evaluated practice experience. It provides an opportunity to apply basic public health competencies acquired through coursework. The Practicum is designed to meet student goals, specialization criteria, and the needs of the Practicum organization. An approved proposal is required prior to enrollment in this course.

MPH Integrative Learning Experience

The MPH core courses must be completed before beginning the Culminating Experience.

MPH 995 Integrative Learning Experience, 2 credits

The Scholarly Project is one component of the MPH Culminating Experience, and enrollment is concurrent with MPH 590. Students complete a project that demonstrates synthesis and application of knowledge acquired through coursework and other public health learning experiences.

MPH 590 MPH Seminar, 1 credit

The MPH Seminar is one component of the MPH Culminating Experience, and enrollment is concurrent with MPH 995. The course addresses current issues in public health. Presentations and discussions focus on dissemination, synthesis, and application of knowledge acquired through coursework and other public health learning experiences.

MPH Optional Internship Experience

MPH 596 Public Health Internship, 6-24 credits

The Public Health Internship is a professional experience in an approved public health-related agency or organization. An internship is optional for MPH students, and can be paid or unpaid. It does not replace the 42-credit required coursework for the MPH degree but is an additional training experience, which would be undertaken when most or all MPH coursework is complete.

Specializations

The three MPH specializations - Health Management & Policy, Population Health Research & Analytics, and Indigenous Health - provide integrative and practical learning experiences that are designed to foster intellectual growth, critical thinking, and essential problem-solving and communication skills. Graduates are prepared to work in many regional, national, and international settings including public health and other government agencies, health care delivery organizations, health plans, non-governmental health organizations, and academic institutions. Each specialization consists of 9 credits.

Health Management and Policy Specialization

The specialization in Health Management & Policy provides students with skills needed to manage health care and public health systems effectively and efficiently, analyze and evaluate health policies, and communicate successfully to effect improvements in the health care and public health systems. The curriculum for the specialization is offered in partnership with the College of Business and Public Administration, which adds depth to the faculty expertise and course offerings available to MPH students.

REQUIRED COURSES = 12 credits

- POLS 551 Health Administration and Organization: 3
- MPH 572 Health Care Budgeting and Finance (Students take either MPH 574 or MPH 572): 3
- MPH 555 Health Law & Policy Analysis: 3
- MPH 583 American Indian Health Policy: 3

ELECTIVE COURSES = 3 credits

With advisor approval, other courses may be substituted.

- POLS 501 Political and Public Policy Analysis: 3
- POLS 561 Creation and Management of Social Enterprises: 3
- POLS 562 Political Advocacy and Social Entrepreneurship: 3
- MPH 574 Foundations of Health Economics: 3
- MPH 558 System Dynamics 2: 3
- GEOG 474 Introduction to Geographic Information Systems (GIS): 2
- GEOG 474L GIS Laboratory (Co-requisite with GEOG 474): 1
- GEOG 574 Advanced Techniques in Geographic Information Systems: 3
- EFR 510 Qualitative Research Methods: 3
- POLS 537 Program Evaluation: 3

Indigenous Health Specialization

The specialization in Indigenous Health is unique nationally in that students will develop the skillsets required to effectively promote public health in Indigenous populations both in the United States and internationally. The curriculum includes analysis of the impact of colonization on health as well as current-day social, policy, environmental, and ecological determinants of health in Indigenous populations. Strategies and best practices in developing and implementing public health programs in Indigenous populations is also covered.

REQUIRED COURSES = 12 credits

- MPH 581 Principles of Indigenous Health: 3
- MPH 582 Social & Ecological Determinants of Indigenous Health: 3
- MPH 583 American Indian Health Policy: 3
- MPH 584 Public Health Programming in Indigenous Populations: 3

ELECTIVE COURSES = 3 credits

With advisor approval, other courses may be substituted.

- POLS 501 Political and Public Policy Analysis: 3
- MPH 570 Special Topics in Population Health: 1-3
- POLS 561 Creation and Management of Social Enterprises: 3
- POLS 562 Political Advocacy and Social Entrepreneurship: 3
- MPH 574 Foundations of Health Economics: 3
- MPH 558 System Dynamics 2: 3
- GEOG 474 Introduction to Geographic Information Systems (GIS): 2
- GEOG 474L GIS Laboratory (Co-requisite with GEOG 474): 1
- GEOG 574 Advanced Techniques in Geographic Information Systems: 3
- EFR 510 Qualitative Research Methods: 3
- POLS 537 Program Evaluation: 3
Population Health Research & Analytics Specialization

The specialization in Population Health Research & Analytics provides students with skills needed to produce convincing and scientifically sound information about population health, evaluate the effectiveness of population health interventions, and provide the basis for improving health policies and programs. The course of study includes training in research methods, biostatistics, informatics, and communication of scientific results. Students learn how to design outcomes and comparative effectiveness studies, collect and analyze population health data, and communicate results.

REQUIRED COURSES = 13 credits

- MPH 533 Advanced Biostatistics 3
- MPH 505 Public Health Data Management in SAS 1
- MPH 532 Biostatistics 2 3
- MPH 550 Population Health Research Methods 3
- MPH 552 Epidemiology 2 3

ELECTIVE COURSES = 3 credits

With advisor approval, other courses may be substituted.

- MPH 534 Bioinformatics 3
- MPH 535 Health Care Data Mining 3
- MPH 538 Introduction to Structural Equation Analysis 3
- MPH 558 System Dynamics 2 3
- MPH 570 Special Topics in Population Health 1-3
- MPH 574 Foundations of Health Economics 3
- GEOG 474 Introduction to Geographic Information Systems (GIS) 2
- GEOG 474L GIS Laboratory (Co-requisite with GEOG 474) 3
- GEOG 574 Advanced Techniques in Geographic Information Systems 3
- EFR 510 Qualitative Research Methods 3
- POLS 537 Program Evaluation 3

Social Work

Master of Social Work (p. 542)

Courses

SWK 501. Human Behavior in the Social Environment I. 2 Credits.
Generalist Human Behavior in the Social Environment I (HBSE I) provides students with foundational knowledge relevant to human life span development, and an introduction to social work systems perspectives. Students critique and apply various frameworks to case scenarios that exemplify client differences in biological, psychological, social, spiritual, and cultural domains. Prerequisite: Admission to the MSW program. Prerequisite or Corequisite: SWK 507.

SWK 502. Human Behavior in the Social Environment II. 2 Credits.
In Human Behavior and the Social Environment II (HBSE II), students acquire foundational knowledge of social work theories relevant to group, community, and organizational practice. The course emphasizes applications of theory to practice for purposes of enhancing economic, social, and environmental well-being. Students learn to recognize diversity through multiple factors, and deepen understanding of how these differences can influence poverty and marginalization, as well as power and privilege. Prerequisite: Admission to the MSW program. Prerequisite or Corequisite: SWK 507.

SWK 503. Generalist Practice with Individuals and Families. 2 Credits.
Generalist Practice with Individuals and Families provides foundational knowledge, values, and skill development for generalist social work practice with individuals and families using a strengths-based perspective. Students develop skills in relationship-building, assuming collaborative partnerships, describing problems, accessing resources, developing intervention plans, and evaluating progress with individuals and families. Prerequisite: Admission to the MSW program. Prerequisite or Corequisite: SWK 501.

SWK 504. Generalist Practice with Treatment and Task Groups. 2 Credits.
In Generalist Practice with Treatment and Task Groups, student develop foundational knowledge, values, and skills necessary for assessing, intervening, and evaluating with the context of group practice. The course emphasizes the identification, analysis, and implementation of evidence-based interventions. Students also learn to apply a social justice framework to group practice. Prerequisites or Corequisites: SWK 501 and SWK 502.

SWK 505. Generalist Practice with Communities and Organizations. 2 Credits.
Generalist Practice with Communities and Organizations acquaints students with the historical roots of social work in community and organizational practice, and with the changing landscape of organizations within the human service sector. Students develop skills relevant to engaging, assessing, intervening, and evaluating community and organizational practice and develop strategies for macro-practice with diverse populations. Prerequisite or Corequisite: SWK 502.

SWK 506. Social Policy. 2 Credits.
Provides a basic understanding of the history and current patterns of social welfare services in the United States. Students apply a policy analysis framework to identify key issues, understand policy development, and assess the role of social policies and political processes on the well-being of individuals, families, and communities. Students also learn to identify opportunities for actively engaging in the policy arena. Prerequisite: Admission to the MSW program.

SWK 507. Generalist Research Methods and Analysis. 2 Credits.
This introductory course provides students with foundational knowledge of research methods and analysis, and prepares them for the development of advanced research skills. Students gain knowledge of the methods of scientific inquiry and how to construct and utilize evidence-informed research for practice. The course emphasizes ethical approaches to research and the effective communication of empirically-based knowledge. Prerequisite: Admission to the MSW program.

SWK 515. Generalist Practice Field Education I. 3 Credits.
Generalist field internship placement in a human service organization. Students apply foundation coursework, emphasizing core competencies and demonstration of practice behaviors. Prerequisite: Admission to field program. Corequisite: SWK 516. S/U grading. F.

SWK 516. Generalist Practice Field Education Seminar I. 1 Credit.
Integration of foundation coursework with field internship placement in a human service organization. Continued development of identification with the Social Work profession is emphasized, as is application of Social Work ethics and values. Corequisite: SWK 515. F.

SWK 517. Generalist Practice Field Education II. 5 Credits.

SWK 518. Generalist Practice Field Education Seminar II. 1 Credit.
Integration of foundation coursework with field internship placement in a human service organization. Continued development of identification with the Social Work profession is emphasized, as is application of Social Work ethics and values. Corequisite: SWK 517. S.

SWK 527. Advanced Generalist Human Behavior and the Social Environment I. 2 Credits.
In Advanced Generalist Human Behavior and the Social Environment I (AG HBSE I), students learn to synthesize and differentially apply relevant conceptual frameworks to guide advanced generalist practice with individuals and families. This course builds upon developmental theories and the social work ecological and systems perspectives. Prerequisite: Admission to the Advanced Generalist Concentration.

SWK 528. Advanced Generalist Human Behavior and the Social Environment II. 2 Credits.
Advanced Generalist Human Behavior and the Social Environment II (AG HBSE II) considers practice theories in relation to social and economic justice. Complexity theory builds upon traditional social systems theory to provide and advanced framework for analyzing practices within the social, economic, and natural environments. Prerequisite: Admission to the Advanced Generalist Concentration.
SWK 520. Advanced Generalist Research Methods and Analysis. 2 Credits.
Advanced Generalist Research Methods and Analysis prepares students to build on foundation research knowledge to further refine and advance the quality of social work practice and that of the larger social work profession. The course emphasizes program as well as practice evaluation. Students use research methods to generate surveys; learn to choose, utilize, and interpret reliable and valid measurement instruments; and apply both qualitative and statistical analysis. Prerequisite: Admission to the Advanced Generalist Concentration.

SWK 530. Advanced Generalist Practice with Individuals. 2 Credits.
Advanced Generalist Practice with Individuals helps students refine and deepen their conceptual and technical knowledge of social work practice with individuals. The course equips students with advanced generalist skills to guide engagement, assessment, intervention, and evaluation with individual clients. Course assignments promote ethical and evidence-based practice relevant to diverse populations. Prerequisite: Admission to the Advanced Generalist Concentration. F,SS.

SWK 532. Advanced Generalist Practice with Families. 2 Credits.
Advanced Generalist Practice with Families teaches students advanced generalist skills in working with families to engage, assess, intervene and evaluate client systems. This class builds upon family therapy theories and their practical applications. Activities and assignments build skills necessary to work with families in therapeutic settings. Prerequisite: Admission to the Advanced Generalist Concentration. F, S.

SWK 534. Advanced Generalist Practice with Treatment Groups. 2 Credits.
Advanced Generalist Practice with Treatment Groups uses an interpersonal perspective as a theoretical foundation for understanding group dynamics. Students build upon foundational knowledge and skills, and develop and demonstrate advanced techniques for engaging individuals in the group process, assessing appropriateness for group membership, developing interventions, and evaluating the treatment group process. Prerequisite: Admission to the Advanced Generalist Concentration. F, S.

SWK 535. Advanced Generalist Practice with Communities. 2 Credits.
Advanced Generalist Practice with Communities equips students with theoretical frameworks and models for community and policy practice, and prepares students to be effective change agents and leaders in community contexts. Students develop a deeper social and economic development orientation, and gain a greater understanding of the changing socio-political contexts of practice, including globalization and the human rights movement. Prerequisite: Admission to the Advanced Generalist Concentration. S.

SWK 536. Advanced Generalist Practice with Organizations. 2 Credits.
Advanced Generalist Practice with Organizations develops practice behaviors related to organizational leadership, managing various organizational systems, and developing an integrated practice approach for the purpose of promoting effective service delivery. Prerequisite: Admission to the Advanced Generalist Concentration. S.

SWK 537. Advanced Generalist Tools for Policy. 1 Credit.
Advanced Generalist Tools for Policy emphasizes the development of skills for effective policy action to promote social, economic, political, and environmental well-being. Prerequisite: Admission to the Advanced Generalist Concentration. S, SS.

SWK 550. Topics Of Social Work Practice. 1-3 Credits.
Repeatable to 9 credits.

SWK 580. Advanced Generalist Practice Field Education I. 5 Credits.
Advanced generalist field internship placement in a human service organization. Students apply concentration coursework, emphasizing core competencies and demonstration of practice behaviors. Prerequisite: Admission to field program. Corequisite: SWK 581. S, U grading. F, S, SS.

SWK 581. Advanced Generalist Practice Field Education Seminar I. 1 Credit.
Integration of concentration coursework with field internship placement in a human service organization. Understanding the role of the MSW-level Social Worker is emphasized, as is advanced application of Social Work ethics and values. Corequisite: SWK 580. F, S, SS.

SWK 582. Advanced Generalist Practice Field Education II. 5 Credits.
Advanced generalist field internship placement in a human service organization. Students apply concentration coursework emphasizing core competencies and demonstration of practice behaviors. Corequisite: SWK 583. Prerequisite or Corequisite: SWK 580. S, U grading. F, S, SS.

SWK 583. Advanced Generalist Practice Field Education Seminar II. 1 Credit.
Integration of concentration coursework with field internship placement in a human service organization. Understanding the role of the MSW-level Social Worker is emphasized, as is advanced application of Social Work ethics and values. Corequisite: SWK 582. F, S, SS.

SWK 593. Individual Study. 1-2 Credits.
Variable topics in social work related areas carried out individually or in small groups under the supervision of the instructor. Repeatable for a maximum of 4 credits. Prerequisite: Consent of instructor. Repeatable to 4 credits.

SWK 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

SWK 997. Independent Study. 2 Credits.

SWK 998. Thesis. 2-4 Credits.
Total of 4 credits required in thesis option. Repeatable to 4 credits.

Master of Social Work

Admission Requirements for the M.S.W. Foundation Program
(For students without a B.S.W.)
The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog. Applicants for the Foundation courses (offered only through the part-time Distance Program for students without a BSW) must meet the following standards:

1. Satisfactory completion of a bachelor’s degree from an accredited institution.
2. At least 30 credit hours of liberal arts courses in such fields as biology, music, languages, anthropology, economics, political science, history, literature, sociology, psychology, and philosophy.
3. A grade of C or higher in a statistics course prior to entering the Advanced Generalist Concentration portion of the MSW program.
4. Willingness to abide by the National Association of Social Worker’s Code of Ethics and the University of North Dakota Code of Student Life.
5. An undergraduate GPA of 3.00 overall or a GPA of 3.00 in the last two years of the undergraduate program.
6. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

Admission Requirements for the M.S.W. Concentration Program
(For students with a B.S.W.)
Applicants for the Concentration courses must meet the following standards:

1. BSW from a CSWE accredited program.
2. An undergraduate GPA of 3.00 overall or a GPA of 3.00 in the last two years of the undergraduate program.
3. A grade of C or higher in a statistics course.
4. Willingness to abide by the National Association of Social Worker’s Code of Ethics and the University of North Dakota Code of Student Conduct.
5. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.
6. Students who have received a bachelor’s degree or higher from the United States or English-speaking Canada are not required to submit the TOEFL.

Admission Schedule

- Campus Program: Annual application deadline is January 15. Classes begin the following Fall Semester (August).
- Distance MSW Foundation Courses: Applicants without a BSW must apply for Foundation courses. Annual application deadline is June 15. Classes begin the following Spring Semester (January).
- Distance Program Concentration Courses: Applicants with a BSW are considered “Advanced Standing” applicants and apply for Concentration
The Department of Social Work will continue to accept applications after the deadline if the cohort is not full.

**Degree Requirements**  
(For students without a B.S.W.)

Students seeking the Master degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Social Work Department. Credit is not granted for life or work experience.

Degree Requirements for Students Completing Both Foundation and Concentration Courses:

1. Successful completion of 60 credit hours of courses approved by the social work faculty with at least a 3.00 grade point average. The number of electives required is dependent on whether a student selects the independent study or the thesis option.

2. Satisfactory completion of Foundation courses (24 credit hours).

   **Foundation Courses**
   - SWK 501 Human Behavior in the Social Environment I 2
   - SWK 502 Human Behavior in the Social Environment II 2
   - SWK 503 Generalist Practice with Individuals and Families 2
   - SWK 504 Generalist Practice with Treatment and Task Groups 2
   - SWK 505 Generalist Practice with Communities and Organizations 2
   - SWK 506 Social Policy 2
   - SWK 507 Generalist Research Methods and Analysis 2
   - SWK 515 Generalist Practice Field Education I 3
   - SWK 516 Generalist Practice Field Education Seminar I 1
   - SWK 517 Generalist Practice Field Education II 5
   - SWK 518 Generalist Practice Field Education Seminar II 1

   **Total Credits** 24

3. Satisfactory completion of the Advanced Generalist Concentration courses (36 credit hours).

4. Completion of the research capstone, SWK 997 Independent Study (2 credits), or SWK 998 Thesis (4 credits).

5. Completion of at least 52 semester credits at UND. A maximum of 8 credits will be allowed for transfer.

6. The development of a program of study in the semester in which the full-time student first enrolls in Concentration courses, or the second semester in which the part-time student enrolls in Concentration courses.

**Degree Requirements**  
(For Students with a B.S.W.)

1. Successful completion of 36 credit hours of courses approved by the social work faculty with at least a 3.00 grade point average. Students who complete SWK 997 Independent Study must complete 5 elective credit hours; students who choose to complete SWK 998 Thesis must take 3 elective credit hours.

2. Satisfactory completion of the Advanced Generalist Concentration core courses listed below:

   **Concentration Courses**
   - SWK 527 Advanced Generalist Human Behavior and the Social Environment I 2
   - SWK 528 Advanced Generalist Human Behavior and the Social Environment II 2
   - SWK 529 Advanced Generalist Research Methods and Analysis 2
   - SWK 530 Advanced Generalist Practice with Individuals 2
   - SWK 533 Advanced Generalist Practice with Families 2

   **Electives** 3-5

   **Total Credits** 32-34

3. Completion of the research capstone, SWK 997 Independent Study (2 credits), or SWK 998 Thesis (4 credits).

4. Completion of at least 28 semester credits at UND. A maximum of 8 credits will be allowed for transfer.

5. The development of a program of study in the semester in which the full-time student first enrolls in Concentration courses, or the second semester in which the part-time student enrolls in Concentration courses.

**Thesis Option:**

1. Full-time students select a Faculty Advisory Committee by the end of the first semester of enrollment in Concentration courses. Part-time students select a Faculty Advisory Committee during the second semester of enrollment in Concentration courses.

2. A proposal must be submitted no later than the semester prior to the student’s final semester.

**Non-Thesis Option:**

1. Full-time students select a faculty adviser by the end of the first semester in Concentration courses. Part-time students select a faculty adviser by the second semester they are enrolled in Concentration courses.

2. A proposal must be submitted no later than the semester prior to the student’s final semester.

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**Master of Arts in Sociology**  
M.A. in Sociology (p. 544)

**Courses**

**SOC 500. Professional Seminar. 1 Credit.**  
The course is intended as an introduction to graduate studies, the university and to the opportunities in the discipline of Sociology. Prerequisite: Admission to the graduate program in Sociology. S/U grading.

**SOC 510. Sociological Inquiry. 3 Credits.**  
This course focuses on the processes by which sociologists perceive, understand, and study social phenomena.

**SOC 511. Contemporary Sociological Theory. 3 Credits.**  
An examination and comparison of the major current sociological theories.

**SOC 512. Advanced Sociological Theory. 3 Credits.**  
Advanced overview of topics in the field of sociological theory. Prerequisite: SOC 511 or consent of instructor. On demand.

**SOC 520. Advanced Research Design. 3 Credits.**  
This course emphasizes the development of research design skills including survey research. Prerequisites: SOC 323 and SOC 326. S.

**SOC 521. Advanced Statistical Methods. 3 Credits.**  
An in-depth examination and application of the following topics as they relate to survey research in sociology: data processing; quantification and analysis of data; analytical statistical design; and procedures. The student will apply the various analytical statistical methods to available data. Prerequisites: SOC 323, SOC 326, and SOC 520. F.

**SOC 528. Seminar in Research Methods. 3 Credits.**  
An examination of special topics in the field of research methods. Prerequisite: SOC 323. Repeatable to 6 credits. On demand.
SOC 537. Graduate Cooperative Education. 3 Credits.
A practical work experience with an employer closely associated with the student's cognate area. Prerequisite: Program of study committee and Director of Graduate Studies approval is required. S/U grading.

SOC 538. Seminar in Social Problems. 3 Credits.
An examination of special topics with a focus on social problems and potential solutions. Prerequisite: Admission to the graduate school or consent of instructor. F, odd years.

SOC 539. Seminar in Sociology. 3 Credits.
An in-depth examination of a particular sub-field in Sociology. Prerequisite: Admission to the Graduate School or permission of instructor. Repeatable to 6 credits. On demand.

SOC 540. Seminar in Social Policy. 3 Credits.
An examination of special topics with a focus on social policy. Prerequisite: Admission to the graduate school or consent of instructor. F, even years.

SOC 569. Introduction to Social Entrepreneurship. 3 Credits.
The purpose of this course is to introduce students to the topics of social entrepreneurship, social entrepreneurs, how social entrepreneurship can become a tool for social change, social science theories and research on social entrepreneurship. Prerequisite: Admission to the Certificate Program in Social Entrepreneurship. S.

SOC 592. Research Experience in Sociology. 1-5 Credits.
Designed for students who are working on research under the direction of one or more faculty. This course provides the opportunity for guided experience in applied research projects. Prerequisite: Consent of instructor. Repeatable to 5 credits. S/U grading. S.

SOC 594. Readings in Sociology. 1-5 Credits.
Designed for students who want additional instruction in sociological topics. Specific arrangements must be made with the instructor prior to registration. Prerequisite: Consent of instructor. Repeatable to 5 credits. F.S.

SOC 599. Internship in Sociology. 1-5 Credits.
A learning experience in a selected community agency or organization determined by the student’s area of interest. The student will select a Sociology professor to oversee the internship, and it is with this professor that the student will complete a contract for the course prior to enrolling. Fieldwork is under the supervision of agency personnel. Two to three hours per week are required in the field per credit hour for each week of the semester. Prerequisite: Consent of instructor. Repeatable to 5 credits. S/U grading. F.S.

SOC 596. Continuing Enrollment. 1-12 Credits.
Repeatable, S/U grading.

SOC 598. Thesis. 1-9 Credits.
Maximum of 9 credits. Repeatable to 9 credits.

Undergraduate Courses for Graduate Credit

SOC 407. Political Sociology. 3 Credits.
Sociological analysis of political and parapolitical groups; voting behavior; political socialization process; power elites, societies and systems of government; power structures. On demand.

SOC 431. Workplace Dynamics. 3 Credits.
This course focuses on understanding contemporary workplace dynamics, informed by how the organization of work has changed across time. Theories underlying the organization of work are examined, with an emphasis on how workplaces are shaped by larger social forces, how they shape society, and how they interact with other organizations. The course concludes with an exploration of diversity in the workforce, especially the ramifications of social class, gender, and race/ethnicity in organizational settings. On demand.

SOC 435. Racial and Ethnic Relations. 3 Credits.
A survey of major U.S. racial and ethnic groups, the histories of their social encounters, and the theoretical perspectives associated with their experiences. On demand.

SOC 436. Social Inequality. 3 Credits.

SOC 437. Population. 3 Credits.
A basic consideration of formal and social demography. The determinants and consequences of population change. On demand.

SOC 450. Deviant Behavior. 3 Credits.
This course examines the nature, types and societal reactions to deviant behavior; special emphasis on the process of social typing, regulation of deviance, deviant subcultures, and identities. On demand.

SOC 492. Research Experience in Sociology. 1-5 Credits.
Students enrolled in this practicum work on a research project under the direction of one or more faculty. The practicum is designed to provide hands-on research and/or statistical experience for those enrolled. Repeatable for a maximum of 10 credits. Repeatable to 10 credits. S/U grading. F,S.

SOC 494. Readings in Sociology. 1-5 Credits.
Designed for students who want instruction in subjects not covered adequately in usual course offerings. Specific arrangements must be made with the instructor prior to registration. Prerequisite: Consent of instructor. Repeatable to 10 credits. F.S.

**Master of Arts in Sociology**

The Master of Arts in Sociology has been suspended and no new applications are being accepted at this time.

**Admission Requirements**

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. A four-year bachelor's degree from a recognized college or university.
2. A minimum of twenty semester hours of undergraduate sociology or related fields with an overall grade point average of 3.00 (A=4.0), a GPA of at least 3.25 for the last two years of undergraduate study; and 3.25 GPA in their major.
3. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.
4. Approved status presupposes some undergraduate training in methods of social research, statistics, and sociological theory and social psychology with a minimum grade of B in each.

**Degree Requirements**

**Thesis Option:**

1. A minimum of 30 semester credits in a sociology track, including the credits granted for the thesis and the research leading to the thesis.
2. At least one-half of the credits must be at or above the 500-level.
3. A maximum of one-fourth (usually 8-9 semester credits) of the credit hours required for the degree may be transferred from another institution.
4. Program work must include 7-9 credits in courses for a chosen sociology track, including approved courses from other designated university departments.
5. Program must include a systematic treatment of the field of sociological theory plus sufficient training in research methods and statistical techniques to assure understanding and competence in their use.
6. Required Courses (grade of “B” or better is required for all of the following):

   SOC 500 Professional Seminar 1
   SOC 510 Sociological Inquiry 3
   SOC 511 Contemporary Sociological Theory 3
   SOC 520 Advanced Research Design 3
   SOC 521 Advanced Statistical Methods 3

Select two of the following:

   SOC 528 Seminar in Research Methods
   SOC 538 Seminar in Social Problems
   SOC 539 Seminar in Sociology
   SOC 540 Seminar in Social Policy
   SOC 569 Introduction to Social Entrepreneurship

**Selected Track:**

**General Track**

7-9 credits of electives as determined by the student and their advisor.
College Teaching Track
7 to 9 credits of electives including SOC 592, 594, 599 and/or courses from the following choices:
- HE 505 The College Student
- HE 507 Collegiate Environments
- T&L 539 College Teaching
- T&L 544 Assessment in Higher Education
- T&L 545 Adult Learners
- T&L 548 The Professoriate

Criminal Justice Track
7 to 9 credits of electives including SOC 592, 594, 599 and/or courses from the following choices:
- CJ 510 Historical Perspectives in Criminology
- CJ 511 Contemporary Perspectives in Criminology
- CJ 515 Human Nature and Crime
- CJ 516 Theories of Punishment
- CJ 535 Seminar in Juvenile Justice
- CJ 540 Seminar in Criminal Justice Policy
- CJ 545 Seminar in Rural Justice Issues
- CJ 555 Seminar in Tribal Justice Systems
- CJ 565 Victimology

For CJ courses, the prerequisite requiring admission to the Criminal Justice Ph.D. program will be waived for Sociology MA students pursuing the Criminal Justice track.

Health and Human Services Track
7 to 9 credits of electives including SOC 592, 594, 599 and/or courses from the following choices:
- EFR 511 Program Evaluation
- EFR 524 Needs Assessment
- SOC 998 Thesis 1-9
Total Credits 30-32

Space Studies
M.S. in Space Studies (p. 549)
Cognate/Minor in Space Studies (p. 549)

AVIT Courses

AVIT 501. General Issues in Aviation/Aerospace. 3 Credits.
This course is designed to introduce students to graduate school, library resources, and faculty research interests. Students will explore the historical, current and future issues related to their own interest areas in the aerospace industry. F,S.

AVIT 502. Aviation Economics. 3 Credits.
An in-depth examination of the economic aspects of the air transportation industry, with microeconomic analysis applied to decision making in the airline, general and corporate aviation, and airports. Topics include: basic economics of air transport supply and demand; demand forecasting; cost drivers; yield, revenue and capacity management; regulatory issues; political influences; and unique economic characters of international commercial aviation.

AVIT 503. Statistics. 3 Credits.
This course is an in-depth study of inferential statistics with emphasis on the analysis of variance models and subsequent comparison procedures. In addition, the course will include coverage of correlation and multiple regression techniques as data analytic tools. Also, coverage of survey construction and analysis of survey data will be presented. Course content will be presented within the context of aviation and psychology examples. (Psychology 541: Advanced Univariate Statistics can be substituted for AVIT 503). Prerequisite: An introductory statistics course or calculus course.

AVIT 504. Research Methods. 3 Credits.
Methods and procedures of development, design and analysis related to aviation industry research. Topics include problem identification, review of literature, research design, and data analysis. This course is designed to give an overview of quantitative, qualitative and mixed-method approaches research design. The course includes the experience of critically evaluating research projects and developing a research project based on the principles discussed in class. Prerequisites: AVIT 501, and AVIT 503 or PSYC 541. F.

AVIT 505. Qualitative Research Methods. 3 Credits.
Examination and analysis of qualitative research design with particular emphasis on approaches relevant to problems in Aerospace Studies or related fields. Students will design a qualitative research project.

AVIT 506. Quantitative Research Methods. 3 Credits.
The purpose of this course is to provide students the opportunity to acquire knowledge and skills necessary to apply quantitative research methods in research. Students will design a quantitative research project. Prerequisite: A graduate level Statistics course.

AVIT 507. Advanced Research Methods. 3 Credits.
This course will be a thorough discussion of the different methodologies utilized in theoretical and applied research. Experimental and quasi-experimental design, and topical areas of survey methodology data mining, simulations, and techniques for dissertation designs. Prerequisites: AVIT 503, AVIT 505, and AVIT 506.

AVIT 510. Aviation Public Policy and Regulations. 3 Credits.
This course will examine and discuss the initiation, formulation and implementation of public policies that affect the various segments of the aviation industry. Various regulatory areas within the aviation industry, such as scheduled air carriers, general aviation, airport operations, air traffic management, and international agreements, will be analyzed. On demand.

AVIT 511. Aviation Information Technology. 3 Credits.
This course is an introduction to information systems essential to an aviation business professional. It will provide an overview of current and emerging technologies in various database, data communication and e-commerce systems.

AVIT 512. Aviation Environmental Issues. 3 Credits.
This course examines current environmental issues within the aviation industry in the context of historical environmentalism, current laws and regulations, and emerging research findings. A broad survey of earth systems precedes a focused examination of contemporary aviation environmental issues.

AVIT 513. Aviation Safety Management Systems. 3 Credits.
An in-depth study of aviation safety management concepts and principles as they relate to effective safety programs within the airlines, corporate aviation, general aviation and airports.

AVIT 514. Aviation Management Theory. 3 Credits.
An in-depth review of organizations in the aviation industry, their structures, environments and leadership as it relates to human behavior. Topics include organizational design, climate and the interactions with individuals, groups, and different organizational structures within the airline, general aviation, corporate aviation and airport organizations.

AVIT 515. Human Factors and Ergonomics: Human Perceptions in Information Systems Design. 3 Credits.
Human perception and information processing will be discussed in relation to information system design requirements to optimize human performance. The Ergonomics components will highlight human-centered design of equipment, devices and processes that conforms to the human body (anthropometry) and its cognitive abilities within the aviation/aerospace environment. Topics include information systems design with regard to compatibility, perception, attention, situation awareness and decision processes. Applications to current workstation design will allow students to have a greater understanding of human centered design goals. On demand.

AVIT 516. Training System Design. 3 Credits.
The process of memory, learning, and judgment will be related to instructional design strategies in the aviation industry, where heavy use of simulation is used in the training and evaluation of aviation professionals. Topics include instructional design and assessment concepts, simulation design and decision making skills. Class presentations include operational problem-solving group work as well as research paper reviews.
AVIT 517. Airline Labor Relations and Law. 3 Credits.
This course will examine and discuss the application and impact of the Railway Labor Act as it pertains to air carrier labor operations. Topics of study will include labor history, organization, alternative dispute resolution, collective bargaining, and emerging labor trends. On demand.

AVIT 518. Human Error. 3 Credits.
The objective of this course is to develop a deeper understanding of the human error and its impact upon human performance in variety of fields. Prerequisite: Graduate Admission. S.

AVIT 520. Strategic Airport Planning. 3 Credits.
This course will explore the elements of airport planning within the public administration domain. Emphasis will be placed on individual airport's strategic plans, how airports operate efficiently and effectively with changing regulations and economic fluctuations in the global marketplace.

AVIT 521. Ethics in Aerospace. 3 Credits.
The course will introduce ethical concepts and frameworks used in professional decision-making. Students will engage with faculty and outside speakers to weigh decisions in the applicable ethical frameworks. Students participation will include graded elements of formal case presentations, class discussion sessions, essay examinations and review of scholarly and trade journal articles. The course will have a strong emphasis on research project design to assess dynamics of ethical decision-making in different populations as well as exploring educational opportunities in the aerospace industry.

AVIT 522. UAS Management. 3 Credits.
This course provides a series of lectures or presentations by visiting lecturers or faculty on various themes related to Unmanned Aircraft Systems (UAS). Prerequisite: Graduate Student Status. F, odd years.

AVIT 523. Aviation Safety Data Analysis. 3 Credits.
The objective of this course is to obtain an understanding of various safety programs conducted throughout the aviation industry and examine the underlying analytical techniques associated with each program. Prerequisite: Graduate student status. SS.

AVIT 524. Air Traffic Management. 3 Credits.
This course will explore the elements of Air Traffic and Next Gen. There will be a discussion on how air traffic control works and the evolution of the Air Traffic Management of the National Airspace System in the US and abroad. Emphasis will be on the current day issues and how Air Traffic Management is changing not only in the US but in Canada, Europe and worldwide. Prerequisite: Admission (or conditional admission) to the Aviation Master of Science. The Aerospace PhD program, or consent of the instructor. S, odd years.

AVIT 525. Legal Issues in Aviation. 3 Credits.
The course will introduce legal concepts and frameworks of the United States’ legal system. Issues particular to the aviation industry will be discussed. Students will engage in formal case presentations and discussions to gain an understanding of the legal issues faced in the aerospace industry. Prerequisite: Admission (or conditional admission) to the Aviation Master of Science program, the Aerospace PhD program, or consent of the instructor. SS, even years.

AVIT 526. UAS and the Law. 3 Credits.
This course introduces students to the laws and policies governing UAS operations including flight regulations, remote sensing issues, and data and cybersecurity issues related to UAS. The class scope of inquiry includes US and international law and examines both civil and military use. On demand.

AVIT 587. Supervised Field Work. 1-3 Credits.
Used primarily for individualized field placement so that the student may acquire practical experiences in the aviation industry. Prerequisite: Consent of graduate director. Repeatable to 6 credits. S/U grading.

AVIT 590. Aviation Seminar. 1-3 Credits.
A series of lectures presented by visiting lecturers and the faculty. Repeatable to 9 credits.

AVIT 591. Readings in Aviation. 1-3 Credits.
Readings in selected Aerospace Studies topics, with written and/or oral reports. Prerequisite: Consent of instructor. Repeatable to 6 credits.

AVIT 593. Individual Research in Aviation. 1-3 Credits.
Individual student projects designed to develop advanced knowledge in a specific area of expertise. A written report is required. May be repeated for up to 6 credits for Master's and up to 12 credits for Ph.D. Repeatable to 6 credits.

AVIT 595. Aviation Capstone. 3 Credits.
The Capstone course integrates, extends and applies knowledge learned in earlier Aviation courses and research projects. The course also undertakes an in-depth study of management theories relevant to the aviation industry and how leaders apply these theories in practice. Students will have the opportunity to demonstrate their knowledge and leadership abilities by working in teams to design and develop a solution to a current aviation problem, which will be assigned by the instructor. This effort will culminate in an on-campus presentation to the faculty and invited industry experts. Prerequisite: AVIT 504 or permission of instructor.

AVIT 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

AVIT 997. Independent Study. 2 Credits.
Independent study and preparation of a written report. Prerequisite: Special Permission Only. On demand.

AVIT 998. Thesis. 4 Credits.
Preparation and defense of a thesis based on original research. Prerequisite: Admission committee approval and consent of instructor. Repeatable to 4 credits.

AVIT 999. Dissertation. 1-12 Credits.
An original research project approved by and completed under the supervision of a dissertation committee. Prerequisites: Graduate standing, approval, completion, and defense of dissertation proposal. Repeatable to 18 credits.

**SPST Courses**

SPST 500. Introduction to Orbital Mechanics. 3 Credits.
This course introduces students without much background in either mathematics or physics to the problems faced everyday by orbital analysts as they track the 7000 satellites which orbit the earth. The course gives the students an ability to converse, as managers and co-workers, with those individuals who are calculating these difficult orbits. This appreciation is important in both the civilian and military sides of the space program. On demand.

SPST 501. Survey of Space Studies I. 3 Credits.
SPST 501 is the first course in a two-course sequence (along with SPST 502) in Space Studies that introduces new students to essential knowledge that will be necessary to successfully complete their M.S. degree in space studies. SPST 501 consists of the following six modules: 1) space history, 2) space policy, 3) space law, 4) planetary and space sciences, 5) space life sciences and human factors, and 6) Earth remote sensing. All modules contain foundational information that will give students the basic knowledge and skills necessary to achieve a broad understanding of the multi- and interdisciplinary nature of space studies; knowledge that can be applied in later courses, such as Capstone; and knowledge that facilitates thesis and other specialized types of instruction and research. Course content in SPST 501 will also be used to assess student learning at the end of their M.S. program via the Comprehensive Examination. Students are expected to master and understand course content, be able to apply course content as appropriate, and demonstrate their understanding of course content prior to graduation. F.

SPST 502. Survey of Space Studies II. 3 Credits.
SPST 502 is the second course in a two-course sequence (along with SPST 501) in Space Studies that introduces new students to essential knowledge that will be necessary to successfully complete their M.S. degree in space studies. SPST 502 consists of the following five modules: 1) space mission design (two modules), 2) orbital mechanics, 3) launch vehicles and propulsion, and 4) robotic spacecraft instrumentation. All modules contain foundational information that will give students the basic knowledge and skills necessary to achieve a broad understanding of the multi- and interdisciplinary nature of space studies; knowledge that can be applied in later courses, such as Capstone; and knowledge that facilitates thesis and other specialized types of instruction and research. Course content in SPST 502 will also be used to assess student learning at the end of their M.S. program via the Comprehensive Examination. Students are expected to master and understand course content, be able to apply course content as appropriate, and demonstrate their understanding of course content prior to graduation. S.
SPST 504. Research Methods in Space Studies. 3 Credits.
This course will provide an introduction to research in Space Studies emphasizing the preparation of a Ph.D. proposal and the dissertation itself. Course content will be tailored to address the specific research methods applicable to the student(s) research interests. Typically given by the student's advisor, but students preparing in the same area (e.g., Planetary Science, Astronomy) may be in a combined section. On demand.

SPST 505. Spacecraft Systems Engineering. 3 Credits.
This course will guide the students through the spacecraft design and proposal process for an actual mission. In this course the students will work in teams on individual spacecraft subsystems, participate in an engineering design review, and create a document which can be submitted for funding for a small satellite project. Lectures will provide an overview of the separate spacecraft subsystems involved in a typical mission, the systems engineering approach to spacecraft development, and the grant writing process. Distance students will interact with on-campus students via conferencing software. Prerequisite: SPST 405 or consent of instructor.

SPST 506. Advanced Orbital Mechanics. 3 Credits.
This course provides a working knowledge of the field of orbital mechanics including the use of appropriate mathematical and computational techniques, the analysis of professional papers in orbital mechanics, and applying the appropriate techniques to solve orbital mechanics problems. Topics covered include orbital elements, perturbations, coordinate systems, orbit determination, and multi-body gravitational problems. Prerequisites: SPST 500, and MATH 266 or equivalent.

SPST 508. Quality Engineering for the Space Industry. 3 Credits.
This course addresses the principles and techniques for establishing quality goals, identification of customer needs and requirements, measurement of quality, and product/process engineering to improve system performance with a focus on the space industry. The main objectives are to provide the student with an understanding of the principles and practice of quality and reliability engineering in general and to provide an in-depth understanding of the quality assurance concepts, strategies, and tools practiced in the space industry. Familiarly with the techniques learned in this course will enable the student to address problems in the design, implementation, measurement, and correction of production and service systems found in the space industry. On demand.

SPST 512. Human Performance in Extreme Environments. 3 Credits.
This course identifies the impact that the stressors of extreme environments have on human performance. The course objectives are to highlight the differences and similarities among extreme environments and to demonstrate that, despite the differences lessons learned from operations in a given extreme environment can be effectively applied to other environments. Although settings such as space, mountains, or deep sea exhibit unique characteristics, the human physiological and psychological reactions and adaptations to these extreme settings stay similar. On demand.

SPST 515. Human Factors in Space. 3 Credits.
This course is a review of the major stresses experienced by humans on entering the space environment. The course objectives include investigation of the psychological and physiological effects experienced by U.S. and Russian space crews, with an emphasis on longer flights. The examination of the avoidance and mitigation of these stresses is an essential need in the future development of human spaceflight. On demand.

SPST 517. Human Spaceflight Systems. 3 Credits.
This course is designed to introduce students to human space systems. The course uses both an engineering and a historical approach to human spaceflight systems covering all manned spacecraft up to today, plus individual subsystems necessary for human occupation. By the end of the course, students will: 1. Understand the engineering and science concepts related to human spaceflight, 2. Understand the major technologies required for human spaceflight, 3. Apply the systems engineering process to a human spaceflight mission: a. Describe the interactions among the elements of a space mission, b. Describe the interactions among all spacecraft subsystems, c. Document design decisions and analysis in a clear and concise manner. F. even years.

SPST 519. Closed Ecological Systems for Life Support. 3 Credits.
The course covers the multiple interactions of human/bioregenerative life support based on physical/chemical regeneration (hybrid) life support environments. The course devotes specific attention to the limits of stability for closed material cycles functioning during long-term remote confined missions. The importance of the human factor as a target link, main sensor, and main integration and control element for the system is considered as providing significant self-sustainability. Advanced scenarios for space life support based on ecological and in situ resource utilization approaches are discussed. On demand.

SPST 520. Asteroids, Meteorites and Comets. 3 Credits.
The small bodies of the solar system provide clues to the origin and early history of the solar system. The planets and larger moons have all been chemically transformed erasing their records of their formation. By contrast, many asteroids, meteorites and comets are essentially unmodified from the time of their origin 4.5 billion years ago and thus preserve a record of the formation epoch. Each of these classes of objects is investigated separately, and relationships between them are examined. Implications for impact hazards and for extraterrestrial resources are also explored. The results of recent and current spacecraft missions to asteroids (e.g., Galileo, NEAR, DAWN, Hayabusa, Rosetta, OSIRIS-Rex, etc.) and to comets (e.g. Giotto, Vega 1, Stardust, Deep Impact, Rosetta, etc.) are reviewed. On demand.

SPST 521. The Planet Mars. 3 Credits.
This course provides an in-depth review of the present state of our knowledge of the planet Mars. Topics that are covered include: the origin and evolution of the planet, the surface geology and geological processes, the geophysical properties of the Martian interior, the origin and evolution of the Martian atmosphere, the present and past climates of Mars, the Martian moons, and the possibility of past or present life on Mars. The American, Soviet/Russian and other nations’ Mars exploration programs are reviewed and the course incorporates the most recent results from spacecraft missions such as Mars Odyssey, the Mars Exploration Rovers (Opportunity Spirit), Mars Express (European Space Agency), Mars Reconnaissance Orbiter, Mars Science Laboratory (Curiosity Rover), MAVEN, and Mangalyaan (India’s Mars Orbiter Mission). Potential future manned and unmanned missions are also discussed. On demand.

SPST 522. Remote Sensing Principles. 3 Credits.
This course covers the basic concepts and foundations of remote sensing, a review of major Earth observing satellite and aircraft platforms, and an investigation of flow of data from satellite to Earth, what it represents, and how to interpret it, using both visual and digital image processing techniques. A field visit to the EROS Data Center in Sioux Falls may also be arranged.

SPST 523. Remote Sensing Applications. 3 Credits.
This course covers the use of advanced image processing algorithms and information extraction techniques for various Earth resource applications such as land cover/land use, environmental change detection, ecology, oceanography, agriculture, forestry, rangeland, water resources, urban planning, natural disaster management, etc. Prerequisite: SPST 522.

SPST 524. Current Topics in Astrobiology. 3 Credits.
This is a multi-disciplinary, literature-intensive examination of astrobiology, which is the study of life in the universe. Students will read scientific research and review papers from a variety of disciplines including astronomy, planetary science, chemistry, biology, and geology. Course goals include: developing proficiency at reading/analyzing diverse scientific papers, developing the ability to incorporate knowledge from multiple disciplines in the study of astrobiological research, and developing the ability to effectively write summary papers to show basic understanding of course material. Prerequisite: SPST 460 or consent of instructor. On demand.

SPST 525. Technical Issues in Space. 1-3 Credits.
An examination of the technological base for the exploration and development of space. An understanding of this technology and of its impact is essential to an understanding of the issues and problems associated with our continuing efforts to explore and settle this new frontier. May be repeated if the topic is different. Repeatable.
SPST 526. Advanced Observational Astronomy. 3 Credits.
An advanced course that utilizes UND Observatory's full wavelength range capabilities to obtain data from a variety of celestial objects with the key goal of learning appropriate ways to reduce and interpret observational data. In particular, the course will focus on visible-wavelength stellar spectroscopy, near-infrared reflectance spectroscopy, solar astronomy, radio astronomy, and color imaging. Students will also engage in reading professional literature for each sub-discipline and prepare a mock publication using data obtained during the course. Learning outcomes and objectives for this course include: 1) Students will be able to locate and observe astronomical objects and reduce data, 2) Develop analytical skills and the ability to interpret observational data, 3) Gain experience with measurement techniques and equipment, and develop the ability to assess uncertainties and assumptions, 4) Communicate professionally, in writing, the results of their observational endeavors, and be able to understand scientific ideas by reading published professional journal articles, 5) Students will be able to understand scientific ethical practices and demonstrate them in the conduct of scientific research, and 6) Students will be able to conduct astronomical research under the direction of the professor, which will ultimately contribute to the generation of new knowledge as it will prepare them to do this professionally. Prerequisites: SPST 425 and MATH 165 or consent of instructor. On demand.

SPST 527. Extraterrestrial Resources. 3 Credits.
This course focuses on the discovery, accessibility, acquisition, processing and utilization of extraterrestrial resources (space resources) from celestial bodies such as the Moon, Mars, asteroids and comets. Consideration will be given to extraterrestrial resources for in situ utilization (such as a Lunar or Martian base), for space operations (such as supporting large scale near-Earth activities or a human Mars mission), and for terrestrial markets. The course will focus on the interplay between the scientific, technical, and economic aspects of acquiring and utilizing such resources. The course will also explore some of the legal and political ramifications and limitations of claiming and recovering space resources. On demand.

SPST 528. Space Environment and the Sun. 3 Credits.
This course will provide an in-depth study of the science and observations of the Sun, space weather, and effects of the Sun on astronauts, Earth, and the space environment. Topics that will be covered include the solar photosphere and active surface phenomena such as sunspots, flares, and coronal mass ejections; the nature of the quiet Sun; the solar interior and helioseismology; space weather and impact of solar particles on the space environment and Earth; the hazards posed to astronauts by solar eruptions; common techniques of solar observations; and a review of the primary types of solar instrumentation and the observatories that currently study the Sun. Students will be able to observe the Sun using the UND Observatory's small solar telescopes; all students will have the opportunity to analyze solar datasets to aid their understanding of the Sun. Prerequisite: MATH 165 or consent of instructor. On demand.

SPST 540. Space Economics and Commerce. 3 Credits.
A study of the economic aspects of space activities, with analysis of the possibilities and the barriers. Key areas include launch services, satellite communications, remote sensing, microgravity materials processing, and interaction with the government. Global competition against subsidies or government-sponsored entities is examined. On demand.

SPST 541. Management of Space Enterprises. 3 Credits.
This course investigates the management of space organizations. These include organizations that are public and private, RD and operations, profit and non-profit. You will learn the basics of management theory, the history of systems management, and the technical issues that must be considered in the management of space RD and operations. On demand.

SPST 542. Risk Management of Space Organizations. 3 Credits.
This course includes a systematic approach to the principles and practices of risk management in the space industry from project initiation through planning, implementation, control and closeout. It discusses various techniques and models for qualitative and quantitative risk assessment and risk mitigation in such areas as cost, schedule, and performance. Decision making under conditions of uncertainty and risk is also discussed. On demand.

SPST 545. Space and the Environment. 3 Credits.
This course is an advanced graduate-level review of international relations theories, policies, and laws as applied to the international implications of global commons. This course introduces the concept of global commons, examines the theories and practices concerning management of global commons, and analyzes the global commons dealing with the challenges of collective action as applied to global, orbital, and planetary environmental changes. On demand.

SPST 551. History of the Space Age. 3 Credits.
This course introduces students to the history of human endeavors in space. These include the development of rocketry, the influence of amateur societies and science fiction, the military development of ballistic missiles, and human and robotic spacecraft.

SPST 552. History of Astronomy and Cosmology. 3 Credits.
This course investigates the history of human endeavors to understand the stars, planets, and cosmos as a whole from a scientific perspective. It covers the early observations and theories of the Babylonians and Greeks through the European Scientific Revolution, and finally to the development of astrophysics and modern cosmology using space vehicles. On demand.

SPST 555. Military Space Programs. 3 Credits.
An introduction to military uses of space by the United States, Russia, and other nations. The course introduces ballistic missiles, anti-ballistic missile and anti-satellite systems, space-based reconnaissance and intelligence-gathering, communications, navigation, acquisition, and military space treaties. On demand.

SPST 560. Space Politics and Policy. 3 Credits.
This course serves as a graduate-level introduction to the field of Public Policy as applied to Space Policy. The course surveys the evolution of Space Policy at several levels of analysis including context, political actors and institutions, political processes, and policy outcomes, and assesses the symbiotic relationship between policy, technology, and science. On demand.

SPST 561. Public Administration of Space Technology. 3 Credits.
This course is an advanced graduate-level review of Public Administration theories as applied to the implementation of space technology programs. In this course, the political, organizational, and technical variables that affect the management processes of space organizations are examined. Prerequisite: SPST 560 or SPST 541. On demand.

SPST 565. Space Law. 3 Credits.
This course serves as a graduate-level introduction to the field of Law as applied to Space Law. The course examines the origins and evolution of the laws of outer space from the beginnings of the space age to the present. International laws governing access and use of space, and national laws regulating governmental and commercial activities in space are reviewed and analyzed. On demand.

SPST 570. Advanced Topics in Space Studies. 1-3 Credits.
Lecture, discussion and readings on advanced topics of current interest. May be repeated if the topic is different. Repeatable.

SPST 574. Remote Sensing in Developing Countries. 3 Credits.
This course will introduce students to remote sensing programs in developing countries and typical remote sensing application areas pertinent to developing countries, such as: potable water, forest fires, vector diseases, environmental degradation, food security, fisheries, floods, droughts, crop pests, etc., with case studies. Prerequisite: SPST 522 or GEOG 475 or consent of instructor. On demand.

SPST 575. Remote Sensing Law and Policy. 3 Credits.
This course focuses on the evolving laws, policies, and institutions that have long-term ramifications for earth observations. Some topics addressed are the United Nations Principles on Remote Sensing, the U.S. Land Remote Sensing Policy Act of 1992, the commercialization of remote sensing activities, as well as manned and unmanned aerial remote sensing systems and their intersection with criminal and civil law. The course will also analyze current and developing remote sensing law, regulations, and technological capabilities, and their implications for both legal and cultural conceptualizations of privacy. At the U.S. domestic level, this will involve 4th Amendment jurisprudence, privacy laws, and case law. On demand.

SPST 581. Field Visit to Space Centers. 1-3 Credits.
This course will provide a first-hand knowledge of selected space centers in the U.S. and/or abroad through an organized field visit. The field visit will be led by a space studies faculty and will include prior preparation through readings, class seminars, lectures and written assignments. May be repeated up to a maximum of 3 credits. Repeatable to 3 credits. S/U grading. On demand.

SPST 590. Space Studies Colloquium. 1 Credit.
A series of lectures presented by visiting lecturers and faculty. May be repeated for up to 2 credits. S/U grading.

SPST 591. Readings in Space Studies. 1-3 Credits.
Readings in selected Space Studies topics, with written and/or oral reports. Repeatable to a maximum of 6 credits. Prerequisite: Consent of instructor. Repeatable to 6 credits.
SPST 593. Individual Research in Space Studies. 1-3 Credits.
Individual student projects designed to develop advanced knowledge in a specific area of expertise. A written report is required. May be repeated for up to 6 credits for Master’s and up to 12 credits for Ph.D. Repeatable to 6 credits.

SPST 595. Space Studies Capstone. 3 Credits.
The capstone course integrates, extends and applies knowledge gained in earlier Space Studies courses and reading. The major component of this course is a collaborative team project inter-relating policy, technology and science. This course is required for students who select the non-thesis option and can be taken after completing at least 25 credits in the program or completion of the curriculum breadth requirements. The course concludes with a required week-long capstone experience on the UND campus in the spring. Prerequisites: SPST 501, SPST 502, SPST 997, Comprehensive Exam, Graduate school status, and a GPA of 3.0 or higher. Prerequisite or Corequisite: Will graduate in the calendar year; either in Spring, Summer, or Fall semesters. F.

SPST 996. Continuing Enrollment. 1-12 Credits.
Prerequisite: Department consent. Repeatable. S/U grading.

SPST 997. Independent Study Report. 2 Credits.
Independent study and preparation of a written report for students taking the non-thesis option in the Master’s program.

SPST 998. Thesis. 1-6 Credits.
An original research project approved by and completed under the supervision of a thesis committee. Prerequisites: Graduate standing in Space Studies and completion and approval of a thesis proposal (see department for approval). Repeatable to 6 credits.

SPST 999. Dissertation. 1-12 Credits.
An original research project approved by and completed under the supervision of a dissertation committee. Prerequisites: Graduate standing, approval, completion, and defense of dissertation proposal. Repeatable to 18 credits. F,S,SS.

Undergraduate Courses for Graduate Credit

SPST 405. Space Mission Design. 3 Credits.
A team design project to develop the requirements for a space mission. The specific mission will vary from time to time. Design teams will work on selected portions of the mission. Accompanying lectures will provide background material. Prerequisite: SPST 200. S.

SPST 410. Life Support Systems. 3 Credits.
A review of the physiological effects of living in space including a discussion of current and near-term life support systems equipment for the provision of oxygen, water, food, and radiation protection. In addition, a review will be made of the issues associated with the development of fully closed ecological life-support systems that will be essential to the long-term development of space. Prerequisite: SPST 200. On demand.

SPST 425. Observational Astronomy. 3 Credits.
This course explores aspects of observational astronomy including monochromatic imaging, astrometry, and photometry. Basic observing techniques, astronomical equipment, characteristics of the night sky, data reduction, interpretations, as well as image processing techniques will be taught. Students will learn to operate a remotely controllable Internet telescope and CCD camera. A broadband Internet connection is recommended. Night observing is required. Prerequisite: PHYS 110. S.

SPST 450. International Space Programs. 3 Credits.
This course will introduce students to the major governmental space programs around the world. The history, activities and future directions of the Russian/Soviet, European/ESA, Chinese, Japanese, Indian and other space programs will be explored. International collaborations between the various programs will also be studied. Prerequisite: SPST 200. On demand.

SPST 460. Life in the Universe. 3 Credits.
This course examines the nature and evolution of life on Earth from its origin to the present time in the context of cosmological evolution, chemical evolution, planetary evolution, biological evolution, and cultural evolution. The possibility of life elsewhere in the universe is considered based on the conditions under which life could arise and flourish. Human changes to the Earth are placed within this context. The future of life on Earth is discussed and the social and cultural implications arising from the discovery of extraterrestrial life are explored. On demand.

Cognate/Minor in Space Studies

The Department of Space Studies invites students from other programs who wish to expand their program of study to include a space-related focus. Our program includes a multidisciplinary set of course offerings that integrate well with other graduate programs. Students interested in space engineering, space business, space law, space policy, space science, space life sciences, space history, or military space can be accommodated. To complete a cognate or minor at the master’s level, students must take three courses for nine semester hours of credit. Our department will work with those doctoral students whose department requires additional credits for a minor degree.

Master of Science in Space Studies

Admission Requirements

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog. The deadlines for applying for admission for each semester are as follows: April 30 for the Fall semester; October 31 for the Spring semester; and February 28 for the Summer semester. Students who apply after these dates for a given semester are encouraged to do so under non-degree status. The requirements for admission to the Space Studies degree program are as follows:

1. Bachelor’s degree from an accredited college or university with an overall grade point average (GPA) of 3.00 or better.
2. Three credits of coursework in statistics or algebra or calculus or computer science.
3. Six credits of coursework in the physical sciences, life sciences, or engineering.
4. Six credits of coursework in the social sciences, history, business, or law.
5. Three credits of coursework in English composition or technical writing.
6. Pre-requisite courses from 2 to 5 above must have been completed at the college level, preferably with a grade of B or higher.
7. The Graduate Record Examination (GRE) General Exam if you plan on seeking funding (GRAs, tuition waivers) via the department or a faculty member. Otherwise, it is not required for admission to the MS program.
8. Submission of a written statement of interest highlighting the candidate’s interest in space studies and motivation to undertake this program.
9. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

Financial Assistance

Graduate assistantships (GTA/GRA) are available from a variety of internal and external sources. These are awarded on the basis of academic merit and students’ abilities to contribute to departmental research and teaching. Students desiring graduate assistantships must take the GRE. The deadlines for applying for financial aid through the Department of Space Studies for a given semester are as follows: April 30 for the Fall semester; October 31 for the Spring semester; and February 28 for Summer semester. Funding is renewable if progress toward the degree, research goals and teaching are satisfactory. Support is typically for two years on a nine-month basis. Summer funding may also be available.

Degree Requirements

All students are required to complete a minimum of 33 credits. The following plan should be used:

1. SPST 501 Survey of Space Studies I and SPST 502 Survey of Space Studies II (6 credits).
2. Students select either the non-thesis or thesis option and declare which social or technical area is their area of specialization. This is the area in which they do their SPST 997 Independent Study Report or SPST 998 Thesis.
3. Two (2) courses from designated social area courses outside the student’s area of specialization (6 credits).
4. Two (2) courses from designated technical area courses outside the student’s area of specialization (6 credits).
Note: The choice of courses in the required social and technical areas outside the student’s area of specialization must take into account the breadth of disciplines, which is a critical part of Space Studies education. In order to meet the breadth requirements within the degree options, students are required to spread their courses as per guidelines outlined in the Department of Space Studies Graduate Student Handbook.

1. One credit of SPST 590 Space Studies Colloquium (1 credit).

5. At least half of the total credit hours must be from classes at the 500-level and above.

6. At least 3 elective courses.

7. Comprehensive Examination: Stages 1 and 2.

Note: Stages 1 and 2 are completed at the conclusion of SPST 501 and SPST 502, respectively. The comprehensive exam process should demonstrate the student’s core knowledge and integrative skills.

Non-Thesis Option:

1. SPST 997 Independent Study Report (2 credits).

2. Comprehensive Examination: Stage 3.

Note: Stage 3 requires the student to apply principles and methodologies, and understanding of the interplay between different, often competing, disciplines. The student must show that information from Space Studies courses can be used to assess and analyze a broadly cross-disciplinary issue. Stage 3 can be taken during either the fall or the spring semester.

1. At least 3 elective courses.

2. Completion of SPST 595 Space Studies Capstone (3 credits).

Thesis Option:

1. SPST 593 Individual Research in Space Studies (1 to 3 credits).

2. SPST 998 Thesis (6 credits).

3. At least 2 elective courses.

4. Submission of the thesis, or an article derived therefrom, to a peer-reviewed journal.

Approval of the thesis option will only be granted if a clear alignment of research interests between a faculty member and a student is demonstrated, and a faculty adviser has been identified and is available to supervise the research. Distance students who wish to complete the thesis option must satisfy the residence requirement. Interested students should consult the School of Graduate Studies or department.

Theatre Arts

Courses

THEA 997. Independent Study. 2 Credits.

THEA 998. Thesis. 1-6 Credits.

Repeatable to 6 credits.

Undergraduate Courses for Graduate Credit

THEA 339. Production Design. 3 Credits.

Exploration of needs for putting together a successful theatrical production. Topics include conceptual work, drafting, model-making and rendering, and scenic painting. Prerequisites: THEA 270 and THEA 300 or consent of instructor. Repeatable to 6 credits. F, odd years.

THEA 404. Acting for the Music Theatre. 3 Credits.

Appreciation of and performance techniques for musical theatre including: voice and movement work, acting, and staging. Prerequisite: Consent of instructor. S, odd years.

THEA 415. Selected Problems in Theatre Arts. 1-3 Credits.

Topics of special interest to faculty and students, such as Theatre Management, Women's Issues in Drama, Polish Theatre and Drama, Improvisation, Scene Painting, and others. Repeatable up to 9 credits. Repeatable to 9 credits. On demand.

THEA 423. History of the Theatre: Classical, Medieval and Renaissance. 3 Credits.

The theatre in performance. The origins of theatrical forms and their relationships to acting style, physical theatre and audience with the cultural environment. F, even years.

THEA 424. History of the Theatre: Seventeenth Century to the Present. 3 Credits.

A continuation of topics covered in THEA 423 beginning with the Seventeenth Century and continuing to the present. Student need not take THEA 423 prior to enrolling in THEA 424. S, odd years.

THEA 425. Play Direction II. 3 Credits.

A continuation of THEA 300 with emphasis on contemporary theories, analysis, research, conceptualization, and implementation. Laboratory experience. Prerequisite: THEA 300 or consent of instructor. S, even years.

THEA 426. Scene Design for the Stage. 3 Credits.

The analysis, research, and conceptualization of the physical context of theatre productions. Emphasis on individual creative projects. Repeatable up to 6 hours. Prerequisite: THEA 270. Repeatable to 6 credits. F.

THEA 427. Costume Design. 3 Credits.

Elements, principles, and styles of design applied to the visual creation of a dramatic character. Repeatable up to 6 credits. Prerequisites: THEA 260 or consent of instructor. Repeatable to 6 credits. S, even years.

THEA 471. Advanced Acting III: Shakespeare. 3 Credits.


THEA 488. Playwriting. 3 Credits.

The playwright’s problems as revealed through practice of writing plays; experimental productions of the student’s creative work whenever possible. Repeatable up to 3 credits.

University Courses

UNIV 529. Study Abroad.

1 to 12 credit equivalents in any one semester (repeatable with permission of the student’s academic department); course required of students studying abroad to maintain full-time status; required prior approval from Graduate School; prior to registration, students will be involved in study abroad procedures inclusive of study abroad application, pre-departure orientation, credit transfer, and related study abroad processes outlined in the Study Abroad Handbook; courses to be taken during the study abroad semester must have pre-approval of the Graduate School, and grades earned will replace this marker course upon completion of credit transfer back to UND. Repeatable. F, S, SS.

UNIV 994. Professional Internship. 1 Credit.

1 credit, repeatable up to 3. Prerequisite: Graduate standing in major department and consent of the Graduate School. Students are placed in approved sites and are engaged in full-time professional practice to acquire knowledge and skills related to their area of study. Supervision must meet criteria established by the Program and the Graduate School. May be repeated up to three consecutive semesters. Enrolled students are granted full-time equivalent student status by the University. SP/UP grading except for the last semester of enrollment which is S/U grading only. Prerequisite: Graduate students admitted to Clinical Psychology or Counseling Psychology. Repeatable to 3 credits.
Departmental Courses, Programs

The following graduate degree and certificate programs are offered through the UND School of Graduate Studies.

The University publishes electronically an official Schedule of Courses before the beginning of each academic term. It lists the class period, building, and room assigned to each course offered that semester or summer session.

Accountancy (p. 324) | MAcc (p. 326)
Aerospace Sciences (p. 327) | PhD (http://und-public.courseleaf.com/graduateacademicinformation/departmentalcoursesprograms/spacestudies/ss-as-phd)
Art and Design Visual Arts (p. 329) | MFA (p. 329)
Arts and Sciences (p. 330)
Atmospheric Sciences (p. 330) | PhD (p. 332) | MS (p. 332)
Aviation (p. 333) | MS (p. 337)
Biology (p. 339) | PhD (p. 342) | MS (p. 342)
Biomedical Engineering (p. 433) | PhD (p. 433) | MS (p. 434)
Biomedical Sciences (p. 343) | PhD (p. 346) | Joint MD/PhD (p. 346) | MS (p. 347)
Chemical Engineering (p. 435) | PhD (p. 436) | MS (p. 437) | MENG (p. 436)
Chemistry (p. 356) | PhD (p. 358) | MS (p. 358) | Combined BS/MS (p. 357)
Civil Engineering (p. 437) | PhD (p. 438) | MS (p. 440) | MENG (p. 440) | Combined (p. 438)
Clinical Translational Science (p. 359) | PhD (p. 360) | MS (p. 361)
Communication (p. 361) | PhD (p. 362) | MA (p. 363)
Communication Sciences and Disorders (p. 364) | MS (p. 365)
Computer Science (p. 365) | PhD (p. 367) | MS (p. 369)
Counseling Psychology and Community Services (p. 370) | PhD (p. 373) | MA (p. 375) | Combined BS/MA (p. 373)
Counseling with a K-12 Emphasis | Cert (http://und-public.courseleaf.com/graduateacademicinformation/departmentalcoursesprograms/counselingpsychologyandcommunityservices/coun-cert)
Criminal Justice (p. 377) | PhD (p. 378)
Curriculum and Instruction (p. 397) | MS (p. 400)
Cyber Security | MS (p. 447)
Data Science | MS (p. 370) | Joint MS/MBA (http://und-public.courseleaf.com/graduateacademicinformation/departmentalcoursesprograms/computerscience/csci-ms-ds-joint)
Early Childhood Education (p. 401) | MS (p. 404) | Accelerated BSEd/MS (http://und-public.courseleaf.com/graduateacademicinformation/departmentalcoursesprograms/education/teachinglearning/accel)
Earth System Science and Policy (p. 378) | PhD (p. 380) | MS (p. 381) | MEM (p. 380)
Educational Foundations and Research (p. 384) | PhD (p. 386)
Learning Analytics | Cert (p. 386)
Quantitative Research Methods | Cert (p. 386)
Educational Practice and Leadership | EdD (p. 395)
Educational Studies | MS (p. 387)
Educational Leadership (p. 388) | PhD (p. 390) | EdD (p. 389) | MS (p. 392) | MEd (p. 391) | Specialist Diploma (p. 392)
Electrical Engineering (p. 441) | PhD (p. 446) | MS (p. 449) | MENG (p. 447) | Combined (p. 446)
Elementary Education (p. 405) | MS (p. 408) | MEd (p. 408)
Energy Systems Engineering (p. 449) | PhD (p. 449) | MS (p. 450) | MENG (p. 450)
Engineering (p. 432) | PhD (http://und-public.courseleaf.com/graduateacademicinformation/departmentalcoursesprograms/engineering/phd)
English Language Learners (TESOL) (p. 409) | MEd (p. 412)
English Language Literature (p. 456) | PhD (p. 457) | MA (p. 458)
Environmental Engineering (p. 450) | PhD (p. 451) | MS (p. 451) | MENG (p. 451) | Cert (p. 450)
Forensic Psychology | MS (p. 531) | MA (p. 530)
Geography and Geographic Information Science (p. 458) | MS (p. 460) | MA (p. 460) | Cert (p. 458)
Geology (p. 461) | PhD (p. 462) | MS (p. 463) | MA (p. 463)
Higher Education (p. 412) | PhD (p. 414) | EdD (p. 414) | MS (p. 415)
History (p. 464) | PhD (p. 466) | DA (p. 465) | MA (p. 467)
eLearning | Cert (http://und-public.courseleaf.com/graduateacademicinformation/departmentalcoursesprograms/education/idt-cert-el)
K-12 Technology Integration | Cert (http://und-public.courseleaf.com/graduateacademicinformation/departmentalcoursesprograms/education/idt-cert-ke)
Kinesiology and Public Health Education (p. 467) | MS (p. 468)
Linguistics (p. 469) | MA (p. 471) | Cert (p. 470)
Mathematics (p. 471) | MS (p. 473) | MEd (p. 473) | Minor (p. 473)
Mechanical Engineering (p. 452) | PhD (p. 453) | MS (p. 455) | MENG (p. 455)
Medical Laboratory Science (p. 474) | MS (p. 475)
Music (p. 475) | MM (p. 478)
Music Education | PhD (p. 477)

Adult Gerontology Primary Care Nurse Practitioner | MS (p. 509)
Family Nurse Practitioner | MS (p. 503) | Post Master's Cert (http://und-public.courseleaf.com/graduateacademicinformation/departmentalcoursesprograms/nursing/familynursepractitioner/cert)

Nurse Anesthesia | MS (p. 491)
Nurse Educator | MS (p. 491) | Post Master's Cert (http://und-public.courseleaf.com/graduateacademicinformation/departmentalcoursesprograms/nursing/postmasterscertificatesinnursing/nez-cert)

Psychiatric Mental Health Nurse Practitioner | MS (p. 497) | Post Master's Cert (http://und-public.courseleaf.com/graduateacademicinformation/departmentalcoursesprograms/nursing/psychiatricmentalhealthnursingnursepractitioner/cert)

Nursing Practice | DNP (http://und-public.courseleaf.com/graduateacademicinformation/departmentalcoursesprograms/nursing/nur-dnp)
Nutrition | MS (p. 510)


Occupational Therapy (p. 511) | OTD (p. 513) | MOT (p. 515)


Physical Therapy (p. 518) | DPT (p. 520)
Physician Assistant Studies (p. 521) | MPAS (p. 523)

Physics and Astrophysics (p. 524) | PhD (p. 526) | MS (p. 526) | Accelerated BS/MS (p. 525)
Psychology (p. 527) | MA (p. 530) | Minor (p. 529)

Behavioral Data Analysis | Cert (p. 529)
Clinical Psychology | PhD (p. 528)
Cyber Security and Behavior | Cert (p. 529)
General/Experimental Psychology | PhD (p. 529)
Public Affairs (p. 531)

Public Administration | MPA (p. 535) | Combined BSPA/MPA (p. 533) | Joint JD/MPA (p. 535) | Cert (p. 534)

Health Administration | Cert (p. 534)
Policy Analysis | Cert (p. 534)
Social Entrepreneurship | Cert (p. 535)

Public Health (p. 536) | MPH (p. 539) | Accelerated BPHE/MPH (http://und-public.courseleaf.com/graduateacademicinformation/departmentalcoursesprograms/publichealth/accel) | Cert (p. 539)

Reading Education (p. 419) | MS (p. 422) | MEd (p. 422) | Accelerated BS/MS (http://und-public.courseleaf.com/graduateacademicinformation/departmentalcoursesprograms/education/readingeducation/accel)

Special Education (p. 423) | MS (p. 429) | MEd (p. 426) | Accelerated BSEd/ MEd (http://und-public.courseleaf.com/graduateacademicinformation/departmentalcoursesprograms/education/specialeducation/accel2)


Social Work (p. 541) | MSW (p. 542)

Sociology (http://und-public.courseleaf.com/graduateacademicinformation/departmentalcoursesprograms/sociology) | MA (p. 544)

Space Studies (p. 545) | MS (p. 549) | Cognate/Minor (p. 549)

Teaching and Learning (p. 392) | PhD (p. 397)

College Teaching | Cert (http://und-public.courseleaf.com/graduateacademicinformation/departmentalcoursesprograms/education/education/cert-ct)

Theatre Arts (p. 550)

University Courses (p. 550)

Unmanned Aircraft Systems | MS (p. 456) | MENG (p. 455) | Cert (p. 454)

Accountancy
Master of Accountancy (p. 326)

Courses

ACCT 501. Seminar in Accounting Issues, 3 Credits.
Addresses current issues in accounting and develops appropriate professional judgment through researching and applying accounting standards. Prerequisite: Permission of MAcc director, F.S.

ACCT 502. Financial Reporting and Decision Making, 3 Credits.
This course provides an overview of financial accounting terminology and concepts, financial statements, and the financial reporting process. Emphasis is placed on the decision usefulness of financial statement information and the financial reporting process as a means of communicating information about firms. Prerequisite: Successful completion of Ivy Software's "Business Math and Statistics-Graduate" self-paced course or demonstrated equivalent competencies, F.S.

ACCT 503. Advanced Financial Accounting, 3 Credits.
Accounting for inter-corporate investments, business combinations, and other advanced financial accounting topics. Prerequisite: Permission of MAcc Director, F.S.

ACCT 504. Seminar in Auditing, 3 Credits.
Expands understanding of the auditing function and provides a framework for analyzing contemporary auditing and assurance issues. Prerequisite: Permission of MAcc Director, F.
ACCT 506. Accounting Systems. 3 Credits.
This course examines business processes and controls within the context of enterprise resource planning systems (ERP), with an emphasis on the financial cycle. Prerequisite: Permission of MAcc Director. S.

ACCT 507. Advanced Managerial Accounting. 3 Credits.
Functional uses of accounting in management of the enterprise.

ACCT 508. Fraud Examination. 3 Credits.
Focuses on understanding types of fraud as well as collecting and evaluating evidence relating to preventing and detecting frauds. Evidence gathering methods will include the examination of documents, publicly available information, and standard practices for interviews and interrogations. Prerequisite: ACCT 405 or equivalent.

ACCT 509. Accounting Information for Decision and Control. 3 Credits.
Management accounting concepts and their application in internal planning, control, and decision-making. Prerequisite: ACCT 502. F,S.

ACCT 510. Taxation of Individuals. 3 Credits.
This graduate-level course covers federal taxation of individuals. Prerequisite: Permission of MAcc Director. F.

ACCT 511. Taxation of Businesses. 3 Credits.
This graduate-level course covers federal taxation of business organizations. Prerequisite: Permission of MAcc Director. S.

ACCT 512. Accounting for Governments & Nonprofits. 3 Credits.
This course covers accounting for governmental and nonprofit entities, including fund accounting. Prerequisite: Permission of MAcc Director. S.

ACCT 521. Financial Accounting I. 3 Credits.
This is a first course in financial accounting for graduate students that has a preparer orientation, but also provides a foundation for analyzing financial statements. Specific content focuses on assets and current liabilities as well as the formats and uses of the primary financial statements. Prerequisite: Permission of MAcc Director. F,S,SS.

ACCT 522. Financial Accounting II. 3 Credits.
This is the second course in the financial accounting sequence for graduate students. The course has a preparer orientation, but also provides a foundation for analyzing financial statements. Prerequisite: ACCT 521 or Permission of MAcc Director. F,S,SS.

ACCT 523. Financial Accounting III. 3 Credits.
This course is part of the graduate financial accounting sequence. The course has a problem-solving orientation, and involves the application of accounting principles to complex transactions and topics including deferred taxes, leases, and pensions. Prerequisite: ACCT 522 or permission of the Director of the Master of Accountancy program. F,S,SS.

ACCT 525. Audit & Assurance Services. 3 Credits.
Examines the role that assurance services play in improving the quality of information and its usefulness for decision making. Materiality and risk assessment are considered along with processes and controls in relation to financial statement audits. Prerequisites: ACCT 522 and ACCT 506, or Permission of MAcc Director. S.

ACCT 526. Advanced Business Law for Accountants. 3 Credits.
Examines legal topics relevant to accountants and financial professionals including securities law, commercial paper, secured transactions, professional liability, corporations and partnerships. Prerequisite: Permission of MAcc Director. S.

ACCT 527. IT Governance and Audit. 3 Credits.
This course introduces topics related to information technology governance and audit, and their roles in internal control and risk management in accounting. Prerequisite: Admission into the Master of Accountancy program or permission of the Director of the Master of Accountancy program. On demand.

ACCT 560. Personal Accountability & Ethics. 3 Credits.
Examines foundations of ethical behavior with an emphasis on personal accountability. Issues, regulations, and cases relevant to accountants and auditors are examined. Approaches for dialogue in the context of ethical issues are introduced. Includes a service project component. Prerequisite: Permission of MAcc Director. F.

ACCT 561. Accounting Ethics and Leadership. 3 Credits.
Examines ethical behavior with an emphasis on personal accountability. Issues, regulations, and cases relevant to accountants and auditors are introduced. Includes a service project component. Prerequisite: Permission of MAcc Director. F.

ACCT 575. Special Topics. 3 Credits.
Specific topic will vary from offering to offering at the discretion of the department. Prerequisites and/or corequisites may be required depending upon the special topic selected. Course may be repeated up to a total of nine credits with permission of department. Prerequisite: Permission of department. Repeatable to 9 credits.

ACCT 590. Contemporary Readings in Accounting. 2 Credits.
Review of outstanding monographs and other writings in the field of accounting.

ACCT 591. Accounting Research. 1-6 Credits.
Individual student projects designed to develop skills in accounting research.

ACCT 592. Research in Federal Tax. 1-4 Credits.
Research in Federal Income Tax with emphasis on corporations and shareholders. Prerequisite: ACCT 411 or equivalent. Repeatable to 4 credits.

ACCT 593. Research in Business Law. 1-4 Credits.
Individual projects designed to develop basic skills in legal research.

ACCT 597. Graduate Accounting Internship. 1-6 Credits.
Compensated work experience in various areas of accounting. Must follow processes and meet internship requirements of the Department of Accountancy and CoBPA. Prerequisite: Permission of MAcc Director. Repeatable to 6 credits. S/U grading. F,S,SS.

ACCT 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

ACCT 997. Independent Study. 2 Credits.
The independent study requires the student to investigate a topic in accounting and to prepare a formal report satisfactory to the MAcc Program Director.

ACCT 998. Thesis. 1-15 Credits.

Undergraduate Courses for Graduate Credit

ACCT 309. Accounting Information Systems. 3 Credits.
The application of systems design and use from the accountant's perspective. Coverage includes computerized and manual accounting systems, elements of internal control, flowcharting, and the interface of accounting and management information systems. Prerequisites: ACCT 301 and Junior or Senior Standing; declared CoBPA majors only. F,S.

ACCT 312. Fund Accounting. 3 Credits.
Financial accounting, control, and reporting for governmental and not-for-profit entities. Prerequisites: ACCT 201 and ACCT 218; Junior or Senior Standing; declared CoBPA majors only. F,S.

ACCT 320. Cost Accounting. 3 Credits.
Principles and techniques used to account for and analyze costs incurred to produce products or services. Prerequisite: ACCT 201. Prerequisite or Corequisite: ACCT 218. F,S.

ACCT 401. Advanced Accounting. 3 Credits.
Special problems in accounting including consolidated statements, partnerships, and foreign exchange. Prerequisites: ACCT 302; Junior or Senior Standing; declared CoBPA majors only. F,S.

ACCT 403. Contemporary Accounting Theory. 3 Credits.
A study of the emerging issues and the problems facing the accounting profession with special emphasis on the authoritative pronouncements as designated by the American Institute of CPAs and the Financial Accounting Standards Board. S-U grading not allowed. Prerequisite or Corequisite: ACCT 401 or consent of instructor; declared CoBPA majors only. F,S.
ACCT 405. Assurance Services. 3 Credits.
Explores methods of improving the quality of information or its context for decision makers. Examples include assurances on the reliability of financial statements, the processes and controls used to manage and operate businesses, assertions and agreements made to third parties, and regulatory compliance. Prerequisites: ACCT 302, ACCT 309, ECON 210; Junior or Senior Standing; declared CoBPA majors only. F.S.

ACCT 406. Independent Assurance. 3 Credits.
Auditing and assurance theory as applied by independent accountants. Prerequisites: ACCT 405 or consent of instructor; declared CoBPA majors only. S.

ACCT 410. Federal Individual Income Tax. 3 Credits.
Federal income tax relating to individuals to include the more complex tax situations. A computerized individual income tax preparation is used as a part of the course. Prerequisites: ACCT 201; Junior or Senior Standing; declared CoBPA majors only. F.S.

ACCT 411. Business Income Taxation. 3 Credits.
Federal income tax relating to corporations and partnerships. Introduction to estate and gift tax and fiduciary income tax. Prerequisites: ACCT 302; Senior Standing; declared CoBPA majors only. F.S.

ACCT 416. Business Law for Accountants. 3 Credits.
Both foundational and advanced topics in business law relevant for the practice of public accountancy including agency law, contracts, negotiable instruments, ethics, legal representation in business, and the impact of selected governmental regulations on businesses. Prerequisites: Declared CoBPA majors or students admitted to the Master of Accountancy program, only. F,S,SS.

Master of Accountancy

Admission Requirements

Admission to Approved status requires:

1. A four-year bachelor’s degree from a recognized college or university.
2. Completion of the Graduate Management Admission Test (GMAT) with a score that equals or exceeds an overall score of 500. In certain circumstances, applicants may substitute the GRE for the GMAT. The requirement for test scores will be waived for applicants holding a bachelor’s degree with a major in accountancy (or equivalent) from an AACSB accredited college and for applicants for combined admission. At the discretion of the MAcc Program Director, test scores may be waived for applicants holding either a graduate degree or a bachelor degree and a demonstrated high quantitative ability.
3. An overall grade point average of at least 2.75 in the undergraduate degree program (based on 4.00 scale), or a 3.00 GPA, or equivalent, for the last two years.
4. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.
5. For either the Professional Accountancy Track or the Practitioner Track only, a bachelor’s degree in accounting, or coursework including intermediate accounting, audit, cost/managerial accounting and taxation that is deemed equivalent by the MAcc Program Director.

Applicants for combined admission and the Accelerated Bachelor’s/Masters’ (ABM) 5 year degree program will be eligible only for the Professional Accountancy Track. Applicants with a bachelor’s degree with a major in accountancy or equivalent accountancy coursework will be eligible only for either the Professional Accountancy Track or the Practitioner Track. Applicants who fail to meet the minimum grade point or GMAT requirements, but who otherwise show high potential for success may be considered for admission to Provisional Status with the approval of the MAcc Program Director and the Department Chair.

Combined Admission

The intent of the combined BAcc/MAcc program is to allow qualified students to complete the requirements for both degrees in one year beyond that required to receive the baccalaureate degree. All requirements for both degrees must be met, and up to six credits of prior-approved graduate accounting coursework, preferably at the 500-level, may be double-counted toward each of the two degrees.

UND students currently completing their junior year (90 credits) towards an accounting undergraduate degree may apply to the MAcc under combined admission. Combined admission to the MAcc program may be granted to accounting students with a minimum of 90 credits completed and both an overall grade point average of 2.75 (based on a 4.00 scale) and 3.00 GPA average for all courses with an accounting prefix completed at the date of application and admission. The GMAT requirement will be waived for those applying for combined admission.

ABM 5 Year Degree Program Admission

The ABM degree program allows exceptional undergraduate students at UND an opportunity to complete the requirements for both the bachelor’s and master’s degrees at an accelerated pace. All requirements for both degrees must be met, and these students may double count up to 12 graduate-level credits towards the requirements for both their Bachelor in Accountancy and their Master of Accountancy degree requirements. ABM students must obtain their Master of Accountancy degree within 12 months of completing the Bachelor of Accountancy degree, provided that the degree requirements can be completed in that timeframe.

High achieving high school students (GPA of at least 3.5/4.0 and an ACT score of 25 or higher) will initially be considered for “identified” status and become eligible for formal admission when they meet the same criteria that undergraduates must meet for admission into the ABM program. Admission is a competitive process. The following are minimum eligibility requirements:

1. Students must meet the School of Graduate Studies admissions eligibility requirements.
2. Students must have completed a minimum of 60 credits, including credits earned from advanced placement and dual credit. Students must apply before completion of the undergraduate degree.
3. Transfer students with a minimum of 60 credits—whether from the transfer institution alone or in combination with UND credits—must have a minimum cumulative GPA of 3.0/4.0 at the time of admission to the ABM program.
4. Students must have a minimum cumulative GPA of 3.0/4.0 at UND at the time of admission into the ABM program.
5. ABM program applicants must submit the standard application to the School of Graduate Studies, the application fee, a personal statement, and transcripts. ABM program applicants do not need to take the GMAT.
6. Additionally, ABM program applicants must submit a detailed Program of Study that describes the 12 credits of double counted courses, the courses that will be taken after being accepted into the MAcc program, the courses that will be taken before graduation from the Bachelor of Accountancy program, and the expected graduation date for each degree. The submitted program of study must be signed by the student, the student’s undergraduate advisor, the student’s graduate advisor, and the Master of Accountancy Program Director.

Degree Requirements

The MAcc degree program offers graduate courses in most of the functional areas of the accounting discipline. The MAcc program has three tracks: the Professional Accountancy Track, the Practitioner Track and the Accounting Fundamentals Track. Program requirements are:

1. A minimum of 30 semester credits of academic work must be completed. The grade point average for all courses listed on the Program of Study must be 3.00 or higher. ABM students must also maintain at least a 3.0 GPA in their double counted courses and as a cumulative GPA for their Bachelor of Accountancy degree. The Program requires completion of the MAcc Core, which includes 6 semester credits of required coursework of ACCT 501 “Seminar in Accounting Issues” and ACCT 503 “Advanced Financial Accounting”.
2. Completion of either (a.) the Professional Accountancy Track or (b.) the Accounting Fundamentals Track or (c.) the Practitioner Track
   a. The Professional Accountancy Track is designed for students holding undergraduate accounting degrees. This track requires 25-26 credits of coursework in addition to completion of the MAcc Core.
The Master of Accounting (MAcc) Program is designed for students who have not completed significant amounts of accounting coursework. It provides a graduate level option for individuals holding a bachelor's degree in a discipline outside of accounting to prepare and meet requirements to sit for the CPA exam in some jurisdictions. In addition to completing the MAcc Core, students in this track are required to complete the following 24 credits of required graduate level accounting coursework:

- ACCT 521 Financial Accounting I 3
- ACCT 522 Financial Accounting II 3
- ACCT 523 Financial Accounting III 3
- ACCT 506 Accounting Systems 3
- ACCT 509 Accounting Information for Decision and Control 3
- ACCT 511 Taxation of Businesses 3
- ACCT 525 Audit & Assurance Services 3
- ACCT 416 Business Law for Accountants 3

Students should be aware that each jurisdiction has different requirements to take the CPA exam. Some jurisdictions require that students earn a minimum number of nonaccounting business credits before applying. Before applying to take the CPA exam students should check the educational requirements in that jurisdiction.

b. The Accounting Fundamentals Track is designed for students who have not previously completed significant amounts of accounting coursework. It provides a graduate level option for individuals holding undergraduate degrees in accounting. This track requires 24 credits of coursework beyond the MAcc core. These 24 credits include:

- ACCT 504 Seminar in Auditing 3
- ACCT 512 Accounting for Governments & Nonprofits 3
- ACCT 561 Accounting Ethics and Leadership 3
- ACCT 509 Accounting Information for Decision and Control 3
- ACCT 511 Taxation of Businesses 3
- ACCT 506 Graduate Accounting Internship 3
- ACCT 416 Business Law for Accountants 3
- ISBC 510 Business Intelligence 3

Students who have already completed courses similar to those in the MAcc curriculum may be required to choose substitutes from graduate credit offerings listed in the catalog. Substitutions require prior approval of the MAcc Program Director.

**Aerospace Sciences**

Ph.D. in Aerospace Sciences (http://und-public.courseleaf.com/graduateacademicinformation/departmentalcoursesprograms/spacesciences/iss-as-phd)

**Courses**

**AVIT 501. General Issues in Aviation/Aerospace. 3 Credits.**

This course is designed to introduce students to graduate school, library resources, and faculty research interests. Students will explore the historical, current and future issues related to their own interest areas in the aerospace industry. F.S.

**AVIT 502. Aviation Economics. 3 Credits.**

An in-depth examination of the economic aspects of the air transportation industry, with microeconomic analysis applied to decision making in the airline, general and corporate aviation, and airports. Topics include: basic economics of air transport supply and demand; demand forecasting; cost drivers; yield, revenue and capacity management; regulatory issues; political influences; and unique economic characters of international commercial aviation.

**AVIT 503. Statistics, 3 Credits.**

This course is an in-depth study of inferential statistics with emphasis on the analysis of variance models and subsequent comparison procedures. In addition, the course will include coverage of correlation and multiple regression techniques as data analytic tools. Also, coverage of survey construction and analysis of survey data will be presented. Course content will be presented within the context of aviation and psychology examples. (Psychology 541: Advanced Univariate Statistics can be substituted for AVIT 503). Prerequisite: An introductory statistics course or calculus course.
AVIT 504. Research Methods. 3 Credits.
Methods and procedures of development, design and analysis related to aviation industry research. Topics include problem identification, review of literature, research design, and data analysis. This course is designed to give an overview of quantitative, qualitative and mixed-method approaches research design. The course includes the experience of critically evaluating research projects and developing a research project based on the principles discussed in class. Prerequisites: AVIT 501, and AVIT 503 or PSYC 541. F.

AVIT 505. Qualitative Research Methods. 3 Credits.
Examination and analysis of qualitative research design with particular emphasis on approaches relevant to problems in Aerospace Studies or related fields. Students will design a qualitative research project.

AVIT 506. Quantitative Research Methods. 3 Credits.
The purpose of this course is to provide students the opportunity to acquire knowledge and skills necessary to apply quantitative research methods in research. Students will design a quantitative research project. Prerequisite: A graduate level Statistics course.

AVIT 507. Advanced Research Methods. 3 Credits.
This course will be a thorough discussion of the different methodologies utilized in theoretical and applied research. Experimental and quasi-experimental design, and topical areas of survey methodology data mining, simulations, and techniques for dissertation designs. Prerequisites: AVIT 503, AVIT 505, and AVIT 506.

AVIT 510. Aviation Public Policy and Regulations. 3 Credits.
This course will examine and discuss the initiation, formulation and implementation of public policies that affect the various segments of the aviation industry. Various regulatory areas within the aviation industry, such as scheduled air carriers, general aviation, airport operations, air traffic management, and international agreements, will be analyzed. On demand.

AVIT 511. Aviation Information Technology. 3 Credits.
This course is an introduction to information systems essential to an aviation business professional. It will provide an overview of current and emerging technologies in various database, data communication and e-commerce systems.

AVIT 512. Aviation Environmental Issues. 3 Credits.
This course examines current environmental issues within the aviation industry in the context of historical environmentalism, current laws and regulations, and emerging research findings. A broad survey of earth systems precedes a focused examination of contemporary aviation environmental issues.

AVIT 513. Aviation Safety Management Systems. 3 Credits.
An in-depth study of aviation safety management concepts and principles as they relate to effective safety programs within the airlines, corporate aviation, general aviation and airports.

AVIT 514. Aviation Management Theory. 3 Credits.
An in-depth review of organizations in the aviation industry, their structures, environments and leadership as it relates to human behavior. Topics include organizational design, climate and the interactions with individuals, groups, and different organizational structures within the airline, general aviation, corporate aviation and airport organizations.

AVIT 515. Human Factors and Ergonomics: Human Perceptions in Information Systems Design. 3 Credits.
Human perception and information processing will be discussed in relation to information system design requirements to optimize human performance. The Ergonomics components will highlight human-centered design of equipment, devices and processes that conforms to the human body (anthropometry) and its cognitive abilities within the aviation/aerospace environment. Topics include information systems design with regard to compatibility, perception, attention, situation awareness and decision processes. Applications to current workstation design will allow students to have a greater understanding of human centered design goals. On demand.

AVIT 516. Training System Design. 3 Credits.
The process of memory, learning, and judgment will be related to instructional design strategies in the aviation industry, where heavy use of simulation is used in the training and evaluation of aviation professionals. Topics include instructional design and assessment concepts, simulation design and decision making skills. Class presentations include operational problem-solving group work as well as research paper reviews.

AVIT 517. Airline Labor Relations and Law. 3 Credits.
This course will examine and discuss the application and impact of the Railway Labor Act as it pertains to air carrier labor operations. Topics of study will include labor history, organization, alternative dispute resolution, collective bargaining, and emerging labor trends. On demand.

AVIT 518. Human Error. 3 Credits.
The objective of this course is to develop a deeper understanding of the human error and its impact upon human performance in variety of fields. Prerequisite: Graduate Admission. S.

AVIT 520. Strategic Airport Planning. 3 Credits.
This course will explore the elements of airport planning within the public administration domain. Emphasis will be placed on individual airport's strategic plans, how airports operate efficiently and effectively with changing regulations and economic fluctuations in the global marketplace.

AVIT 521. Ethics in Aerospace. 3 Credits.
The course will introduce ethical concepts and frameworks used in professional decision-making. Students will engage with faculty and outside speakers to weigh decisions in the applicable ethical frameworks. Students participation will include graded elements of formal case presentations, class discussion sessions, essay examinations and review of scholarly and trade journal articles. The course will have a strong emphasis on research project design to assess dynamics of ethical decision-making in different populations, as well as exploring educational opportunities in the aerospace industry.

AVIT 522. UAS Management. 3 Credits.
This course provides a series of lectures or presentations by visiting lecturers or faculty on various themes related to Unmanned Aircraft Systems (UAS). Prerequisite: Graduate Student Status. F, odd years.

AVIT 523. Aviation Safety Data Analysis. 3 Credits.
The objective of this course is to obtain an understanding of various safety programs conducted throughout the aviation industry and examine the underlying analytical techniques associated with each program. Prerequisite: Graduate student status. SS.

AVIT 524. Air Traffic Management. 3 Credits.
This course will explore the elements of Air Traffic and Next Gen. There will a discussion on how air traffic control works and the evolution of the Air Traffic Management of the National Airspace System in the US and abroad. Emphasis will be on the current day issues and how Air Traffic Management is changing not only in the US but in Canada, Europe and worldwide. Prerequisite: Admission (or conditional admission) to the Aviation Master of Science, The Aerospace PhD program, or consent of the instructor. S, odd years.

AVIT 525. Legal Issues in Aviation. 3 Credits.
The course will introduce legal concepts and frameworks of the United States’ legal system. Issues particular to the aviation industry will be discussed. Students will engage in formal case presentations and discussions to gain an understanding of the legal issues faced in the aerospace industry. Prerequisite: Admission (or conditional admission) to the Aviation Master of Science program, the Aerospace PhD program, or consent of the instructor. SS, even years.

AVIT 526. UAS and the Law. 3 Credits.
This course introduces students to the laws and policies governing UAS operations including flight regulations, remote sensing issues, and data and cybersecurity issues related to UAS. The class scope of inquiry includes US and international law and examines both civil and military use. On demand.

AVIT 587. Supervised Field Work. 1-3 Credits.
Used primarily for individualized field placement so that the student may acquire practical experiences in the aviation industry. Prerequisite: Consent of graduate director. Repeatable to 6 credits. S/U grading.

AVIT 590. Aviation Seminar. 1-3 Credits.
A series of lectures presented by visiting lecturers and the faculty. Repeatable to 9 credits.

AVIT 591. Readings in Aviation. 1-3 Credits.
Readings in selected Aerospace Studies topics, with written and/or oral reports. Prerequisite: Consent of instructor. Repeatable to 6 credits.

AVIT 593. Individual Research in Aviation. 1-3 Credits.
Individual student projects designed to develop advanced knowledge in a specific area of expertise. A written report is required. May be repeated for up to 6 credits for Master's and up to 12 credits for Ph.D. Repeatable to 6 credits.
AVIT 595. Aviation Capstone. 3 Credits.
The Capstone course integrates, extends and applies knowledge learned in earlier Aviation courses and research projects. The course also undertakes an in-depth study of management theories relevant to the aviation industry and how leaders apply these theories in practice. Students will have the opportunity to demonstrate their knowledge and leadership abilities by working in teams to design and develop a solution to a current aviation problem, which will be assigned by the instructor. This effort will culminate in an on-campus presentation to the faculty and invited industry experts. Prerequisite: AVIT 504 or permission of instructor.

AVIT 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

AVIT 997. Independent Study. 2 Credits.
Independent study and preparation of a written report. Prerequisite: Special Permission Only. On demand.

AVIT 998. Thesis. 4 Credits.
Preparation and defense of a thesis based on original research. Prerequisite: Admission committee approval and consent of instructor. Repeatable to 4 credits.

AVIT 999. Dissertation. 1-12 Credits.
An original research project approved by and completed under the supervision of a dissertation committee. Prerequisites: Graduate standing, approval, completion, and defense of dissertation proposal. Repeatable to 18 credits.

Art and Design Visual Arts

Master of Fine Arts (p. 329)

Courses

ART 501. Sculpture. 1-6 Credits.
Extensive work and study in three dimensional form, media, and methods. Repeatable to 30 credits. Prerequisite: Permission of instructor. Repeatable to 30 credits.

ART 510. Art History: Issues in Contemporary Art. 3 Credits.
Examines issues in contemporary art relevant to practicing artists. Addresses current intellectual debates around the work of contemporary artists and issues relevant to artists working in a regional setting. Examines the institutional context of contemporary art practice, such as exhibitions venues and funding for professional artists.

ART 520. Painting. 1-6 Credits.
Individual research and experimentation in painting. Repeatable to 30 credits. Prerequisite: Permission of instructor. Repeatable to 30 credits.

ART 530. Drawing. 1-6 Credits.
Experimentation and elaboration to drawing skills and techniques, both innovative and traditional. Emphasis on individual exploration. Repeatable to 30 credits. Prerequisite: Permission of instructor. Repeatable to 30 credits.

ART 537. Graduate Cooperative Education. 1-4 Credits.
An elective opportunity in the VA graduate program toward the MFA to participate in an apprentice experience in one's selected field of concentration. Prerequisites: Graduate standing and approval of departmental advisor/coordinator.

ART 540. Printmaking. 1-6 Credits.
Individual research and experimentation in printmaking. Repeatable to 30 credits. Prerequisite: Permission of instructor. Repeatable to 30 credits.

ART 550. Ceramics. 1-6 Credits.
Individual instruction and experimentation in Ceramics. Repeatable to 30 credits. Prerequisite: Permission of instructor. Repeatable to 30 credits.

ART 560. Metalsmithing: Jewelry and Small Sculpture. 1-6 Credits.
Exploration of historical, traditional, and innovative jewelry and small sculpture techniques using non-ferrous metals, gems, and other materials. Repeatable to 30 credits. Prerequisite: Permission of instructor. Repeatable to 30 credits.

ART 570. Photography. 1-6 Credits.
Individual instruction and experimentation in Photography. Prerequisite: Permission of instructor. Repeatable to 30 credits. F.S.

ART 573. Graphic Design. 1-6 Credits.
Individual research and experimentation in graphic design and/or interdisciplinary art. Prerequisite: Permission of instructor. Repeatable to 30 credits. F.S.

ART 590. Individual Research. 1-9 Credits.
Research and creative experiences within a specific area of interest in the Visual Arts and emphasis on refinements of aesthetic applications of techniques and media. Repeatable to twenty-two credits. Prerequisite: Permission of instructor. Repeatable to 22 credits.

ART 599. Professional Exhibition. 3 Credits.
Artist statement, preparation, design, installation, and catalog of solo show. Prerequisite: Permission of student's graduate committee.

ART 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

Undergraduate Courses for Graduate Credit

ART 410. Advanced History of Art. 3-6 Credits.
Study of varied topics in the history of art and architecture. May be repeated as title changes. Possible subjects may include but are not limited to: Non-Western Traditions, 20th 21st Century Art, Late 18th through 19th Century Art, Renaissance Baroque Art and Feminist Art. Prerequisites: ART 210 and ART 211. Repeatable. F.S.

ART 417. History of Art: Museum Studies Practicum. 3-6 Credits.
Experience working in an art exhibition setting involving practical experience, research, a written paper and presentation. Prerequisites: ART 210 and ART 211. Repeatable to 36 credits. F.S.

ART 490. Special Projects/Independent Research. 1-6 Credits.
Advanced independent study within a specific art discipline outside of subject areas normally covered within regularly scheduled courses in studio art, graphic design, art history and art education. Formal contract must be signed with professor of record. Repeatable, no more than 6 credits in each discipline area. Prerequisite: Instructor consent. Repeatable to 6 credits. F.S.

Master of Fine Arts

Admission Requirements

For students who have earned graduate credit in art or hold an MA degree, Image portfolio of twenty (20) clearly identified images representative of the student's recent work and/or documentation on a USB drive. Images should be submitted at 72 dpi with the longest side not to exceed 1280 pixels in length. The work samples should be submitted to the Department of Art and Design's Graduate Committee and accompanied by a list containing the viewing sequence, titles, date of completion, dimension (duration), and media.

1. Admission to Approved Status requires a BA or BFA degree with at least 63 semester hours in studio courses plus a minimum of 12 semester hours in art history from a regionally accredited college or equivalent.

2. A cumulative Grade Point Average (GPA) of at least 2.75 for all undergraduate work or a GPA of at least 3.0 for the junior and senior years of undergraduate work (based on A= 4.00).

3. Satisfy the School of Graduate Studies' English Language Proficiency requirements as published in the graduate catalog.

4. Image portfolio of twenty (20) clearly identified images representative of the student's recent work and/or documentation on a USB drive. Images should be submitted at 72 dpi with the longest side not to exceed 1280 pixels in length. The work samples should be submitted to the Department of Art and Design's Graduate Committee and accompanied by a list containing the viewing sequence, titles, date of completion, dimension (duration), and media.

5. Artist Statement supporting the image portfolio or other documentary application information on a USB drive.

6. For students who have earned graduate credit in art or hold an MA degree, a maximum of 15 credits may be accepted towards the MFA degree. Of those 15 credits, up to 6 credits in Art History may be accepted towards the 9-credit art history requirement.

The graduate program in visual arts operates on a rolling admissions basis. Applicants are advised to apply by March 1 for fall admission or October 1 for spring admission. Acceptance as well as financial support is considered pending availability of resources.

Degree Requirements

Students seeking the Master of Fine Arts degree at the University of North Dakota must satisfy all general degree requirements set forth by the School
of Graduate Studies as well as particular requirements set forth by the Department of Art and Design.

1. The program consists of 60 credits in the following areas:

2. Major Emphasis Area (Ceramics, Painting, Drawing, Metalsmithing, Printmaking, Photography, Graphic Design, or Sculpture)  
   Art History and Theory (See #6 under Admission Requirements)  
   Electives (including at least 12 credits in art)  
   Professional Exhibition  
   Total Credits

3. At least one-half of the credits must be at or above the 500-level.
4. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.
5. A critique of each MFA candidate’s work will be conducted by the entire faculty at the end of their first and second semesters in the program. MFA candidates in subsequent years of the program are expected to attend and participate.
6. After the formation of the candidate’s graduate thesis committee two formal reviews of the MFA candidate’s work will be conducted. See candidacy for degree requirements.
7. Prerequisites to graduation include:
   a. Preparation and presentation of a Professional Exhibition, which will be a formal presentation of creative work.
   b. Supplementary exhibitions materials including artist’s statement, exhibition announcement, and publicity materials.
   c. An image portfolio and/or documentation in cd/dvd format of the Professional Exhibition must be submitted to the Department of Art and Design for its permanent files. Images should be submitted at 72 dpi with the longest side not to exceed 1280 pixels in length.

Professional Exhibition and Artist Lecture

All MFA candidates are required to register for ART 599 Professional Exhibition (three credits). The intention is to give candidates a summary experience as they near the end of their formal training, which will serve as a benchmark in their career development. The artist’s statement may include such things as a critical statement on the candidate’s work, its development, its cultural, philosophical and historical context, and/or reference to the artist’s procedures and techniques. The candidate will present an Artist Lecture that will be open to the public. The candidate’s graduate thesis committee will then examine and evaluate the student’s performance in the Professional Exhibition and Artist Lecture, and report the results to the School of Graduate Studies on the form titled “Final Report on Candidate” by the deadline specified in the academic calendar. The Thesis Committee Chairperson will certify receipt of an image portfolio of the Exhibition.

M.F.A. Candidate Recommended Timetable for Completion of Program

While the program is normally completed in three years, it is possible to achieve the degree in two years.

<table>
<thead>
<tr>
<th>Year</th>
<th>Fall Semester</th>
<th>Spring Semester</th>
<th>Project</th>
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<tbody>
<tr>
<td>First Year</td>
<td>Full Faculty Critique</td>
<td>Turn in Program of Study to School of Graduate Studies for Approval Form Thesis Committee Review</td>
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<td></td>
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<td>Evaluation of Second Thesis Committee Review or Continued Program Enrollment</td>
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<tr>
<td>Second Year</td>
<td>First Thesis Committee Review</td>
<td>Second Thesis Committee Review or Continued Program Enrollment</td>
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Candidacy for the Degree

Admission of a student to the School of Graduate Studies as a degree student in Approved Status implies only that the student has met the minimum entrance requirements and will be permitted to take graduate courses that normally may be expected to lead to a degree. The student has not been admitted as a candidate for a degree. Advancement to candidacy is granted only after the completion of specific requirements and upon the recommendation of the faculty advisory committee. Candidates for the MFA degree will not be permitted to graduate in the same semester or summer session in which they are advanced to candidacy.

Students in Approved Status may be advanced to candidacy for a MFA degree when they have satisfied the following requirements in approximately the following sequence:

1. Completion of the first comprehensive review by the candidate’s graduate thesis committee. During the course of study, all MFA students will be evaluated twice and recommendations will be made regarding continuation in the degree program. The first review, held near the end of the second semester or the beginning of the third, is conducted by a graduate thesis committee of three members from the Graduate Faculty of the Department of Art and Design. After formal review of the student’s work, the committee prepares a written summary of the results of the evaluation and a recommendation regarding the continuance of the student. A copy of the evaluation is sent to the School of Graduate Studies.
2. Program of Study should normally be approved no later than the beginning of the third semester of enrollment.
3. Completion of a substantial portion of the course work for the degree with an overall GPA of no less than 3.00.
4. Completion of the second committee review prior to the end of the semester preceding the semester in which the student expects to graduate (normally the third or the beginning of the fourth semester). The evaluation will be conducted by the student’s graduate thesis committee and will consist of a review of the student’s progress toward completion of degree requirements, and a review of plans for the professional exhibition and Artist Lecture. The results of the evaluation will be filed with the School of Graduate Studies and will include a recommendation regarding advancement to candidacy for the MFA degree.
5. Recommendation to the Dean of the School of Graduate Studies for advancement to candidacy by the graduate thesis committee.

Final Evaluation

The graduate thesis committee will examine and evaluate the student’s performance in the Professional Exhibition and Artist Lecture, and report the results to the School of Graduate Studies on the form titled “Final Report on Candidate” by the deadline specified in the Academic Calendar. The Thesis Committee Chairperson will certify receipt of an image portfolio of the Exhibition.

Courses

A&S 599. Special Topics. 1-4 Credits. Repeatable.

Atmospheric Sciences

M.S. in Atmospheric Sciences (p. 332)
Ph.D. in Atmospheric Sciences (p. 332)
Courses

ATSC 500. Introduction to Atmospheric Research. 1 Credit.
This course is required for all Atmospheric Science graduate students. A course in the methodology and philosophy of doing research in the atmospheric sciences. Also includes discussion of related topics, including creativity, publication, science and society, and career-related activities. S/U grading.

ATSC 505. Advanced Atmospheric Dynamics. 4 Credits.
A graduate level course in linear perturbation theory, atmospheric oscillations, hydrodynamic instability and the life cycle of extratropical cyclones. F.

ATSC 510. General Circulation. 3 Credits.
Covers the large scale dynamical processes in the atmosphere, including the observed circulation, processes that maintain the circulation, mid-latitude wintertime circulation anomalies, large scale structure of the tropical atmosphere, and the stratosphere and its link to the troposphere. Prerequisite: ATSC 505.

ATSC 515. Advanced Climatology. 3 Credits.
A course on climate from the perspective of utilizing climatic knowledge and information to examine the current state of the climate and how this can be used to explore potential future states. Topics included are an introduction to climatology, basic data and their analysis, climatological analysis, statistical methods, applications and synoptic climatology. Prerequisite: ATSC 540.

ATSC 518. Advanced Synoptic Meteorology. 3 Credits.
Advanced analysis of atmospheric processes important to large-scale flows. Quasigeotropic and semi-geotropic theory, behavior of extratropical systems, fronts and jets, geotropic adjustment, blocking and IPV thinking. Prerequisite: ATSC 505 or equivalent.

ATSC 520. Atmospheric Chemistry. 3 Credits.
Composition of clean and polluted air. Sources and sinks of atmospheric gases and aerosols. The role of atmospheric chemistry in global environmental issues such as acid rain, visibility reduction, climatic change, oxidant enhancement, etc.

ATSC 525. Atmospheric Radiation. 3 Credits.

ATSC 528. Atmospheric Data Analysis. 3 Credits.
Introduction to techniques used in the analysis of meteorological data and methods for interpreting their effects: polynomial fitting, method of successive corrections, statistical methods, variational techniques, model initialization, data assimilation, and filter design. Prerequisite: Proficiency in a programming language.

ATSC 530. Numerical Weather Prediction. 3 Credits.
Covers scale analysis in atmospheric prediction; numerical methods; various atmospheric prediction models; the use of filtering, smoothing, interpolation, weighting and adjustment in objective analysis techniques; numerical forecasting; current NWP structures and applications. Prerequisite: ATSC 505.

ATSC 532. Cloud Microphysics Parameterization & Simulation. 3 Credits.
A study of how cloud microphysics processes are parameterized within weather models. Includes a review of the theoretical basis of cloud physics processes, hands-on examination of the parameterization assumptions and their impacts, and analysis and display of model output. Course offered every four years. On demand.

ATSC 535. Measurement Systems. 3 Credits.
An advanced course in meteorological measurement systems, including coverage of performance characteristics of sensors, calibration standards, measuring devices, the effects of making measurements in the atmospheric environment, meteorological measurement systems, and digital data logging and processing.

ATSC 538. Advanced Earth System Sciences. 3 Credits.
Introduction and synthesis of understanding of the components of the Earth system, their interactions, and the consequences of changes in the Earth system for life; identify and quantify Sun-Earth connections associated with solar variability and impact on the Earth System; explore interactions among the major components of the Earth system: continents, oceans, atmosphere, ice, and life; distinguish natural from human-induced causes of change; understand and predict the consequences of change; and consider analysis techniques, with emphasis placed on numerical modeling of phenomena. Prerequisite: Permission of instructor.

ATSC 540. Statistical Methods in Atmospheric Science. 3 Credits.
A course on statistical methods used to describe, analyze, test, and predict atmospheric phenomena. The topics will review basic statistical concepts, statistical data interpretation, theoretical probability distributions, hypothesis testing, uncertainty analysis, regression, time series analysis, and statistical weather prediction and verification. Prerequisite: Must have completed course work in statistics or consent of instructor.

ATSC 545. Hydrometeorology. 3 Credits.
A course designed to study the coupling of atmospheric and hydrologic processes. Topics will cover basic hydrologic concepts, review of atmospheric thermodynamics, atmospheric moisture, precipitation processes, hydrologic cycle, evaporation/evapotranspiration, infiltration, snow and snow melt processes, runoff mechanisms, land surface processes, and hydrologic modeling.

ATSC 548. Advanced Mesoscale Dynamics. 3 Credits.
An in-depth theoretical and analytical examination of mesoscale convective processes, initiation and characteristics; mesoscale features of tropical systems; orographically-forced and -influenced circulations; local and regional circulations; high-latitude mesoscale systems; an introduction to mesoscale model design, parameterization development, and evaluation. Prerequisite: Upper division or graduate course in dynamics or constant of instructor; ATSC 505 is a recommend corequisite but not required.

ATSC 550. Tropical Meteorology. 3 Credits.
A study of tropical phenomena over a range of scales, including small scale (cumulus clouds, thunderstorms), mesoscale (sea breezes, squall lines), large scale (waves and cyclones), and planetary scale circulations (trade winds, equatorial trough, equatorial waves, monsoons, intraseasonal oscillations, ENSO). Methods for obtaining and using information to study tropical phenomena are examined. Prerequisite: Graduate standing.

ATSC 552. Satellite Meteorology. 3 Credits.
A study of remote sensing technologies for atmospheric applications. Topics include basic radiation and remote sensing methods, image data processing, atmospheric and geometric corrections, radiometric and geometric enhancements, image classification, and selected meteorological applications using satellite remote sensing. S, even years.

ATSC 553. Advanced Satellite Meteorology. 3 Credits.
Addresses advanced topics in satellite meteorology. Includes advanced topics in radiation, scattering by molecules and particles, and retrieval theory and methods for meteorological applications using passive and active satellite remote sensing. Prerequisites: ATSC 552 and ATSC 525. F, even years.

ATSC 555. Advanced Surface Transportation Weather. 3 Credits.
Addresses weather research topics in contemporary surface transportation. Includes maintenance decision support systems construction, applications of artificial intelligence methods, and investigation of land surface effects and applications of advanced mesoscale weather prediction modeling in a surface transportation environment. Prerequisite: ATSC 510 or consent of instructor.

ATSC 560. Boundary Layer Meteorology. 3 Credits.
The interaction of the atmosphere with the earth's surface. The transfer of heat, moisture, and momentum between the atmosphere and the underlying surface. The description of turbulence and the effects of turbulence on the transfer properties of the atmosphere. Prerequisite: ATSC 505.

ATSC 565. Air Quality. 3 Credits.
An in-depth introduction to important areas within the air quality field. Topics covered include the physical and chemical nature of air pollutants; their sources, control, and transport through the atmosphere; their interaction with other atmospheric constituents; their removal through cloud processes, fallout and wet deposition; their effects on visibility, human health, ecosystems, and global climate. Methods related to the measurements of atmospheric pollutants, air quality modeling, and air quality forecasting are discussed. Prerequisites: CHEM 121 or equivalent, and PHYS 251 or equivalent.

ATSC 570. Seminar. 1 Credit.
A discussion course on current research topics and publications related to the field of atmospheric sciences. Students, faculty and guest speakers will present their research and lead the discussion during seminar. Repeatable to 3 credits. Repeatable to 3 credits. S/U grading.

ATSC 575. Current/Special Topics in Meteorology. 3 Credits.
A course in specific advanced topics in atmospheric sciences. Largely delivered in a structured, lecture format. Repeatable to 12 credits. Repeatable to 12 credits.
ATSC 594. Independent Studies. 2-4 Credits.
Survey investigations, literature searches and/or preliminary research topic of interest to the student. Repeatable to 4 credits. Repeatable to 4 credits.

ATSC 596. Supervised Research. 1-4 Credits.
Research in consultation with departmental faculty. Repeatable to 12 credits. Prerequisites: Master’s degree student and consent of the instructor. Repeatable to 12 credits. S/U grading.

ATSC 598. Dissertation Research. 1-8 Credits.
Research, in support of the doctoral dissertation, performed in consultation with the student’s advisor. Repeatable to 15 credits. Prerequisite: Consent of the instructor. Repeatable to 15 credits. S/U grading.

ATSC 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

This course is required for all Atmospheric Science graduate students enrolled in the non-thesis option. Students will be required to independently investigate a topic related to the major field. This study need not be an original contribution to knowledge, but may be a presentation, analysis, and discussion of ideas already in the literature of the field. Prerequisite: Students are required to complete at least one course from each of the core areas: dynamics, physical, earth system, and tools, as well as ATSC 500. S/U grading. F.S,SS.

ATSC 998. Thesis. 1-6 Credits.
Repeatable to 9 credits. Repeatable to 9 credits.

ATSC 999. Dissertation. 1-9 Credits.
Repeatable to 18 credits. Repeatable to 18 credits.

Undergraduate Courses for Graduate Credit

ATSC 441. Radar Meteorology. 4 Credits.
Advanced radar theory, including basic radar principles, digital processing of radar signals, Doppler radar principles, displays, polarization techniques, and characteristic returns. Includes laboratory. Prerequisite: ATSC 345 or consent of instructor. S, odd years.

ATSC 450. Introduction to Cloud Physics Meteorology. 4 Credits.
A study of the physics of clouds with emphasis on microphysical processes involved in cloud formation, precipitation production, and dissipation. Includes Laboratory. Prerequisites: ATSC 350 and ATSC 353. F, odd years.

Doctor of Philosophy in Atmospheric Sciences

Admission Requirements
The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog. In addition, students must fulfill the requirements below for admission to the Atmospheric Sciences doctoral degree program.

1. A bachelor’s or master’s degree from a recognized institution. For U.S. degrees, accreditation must be by one of the six regional accrediting associations.
2. A cumulative GPA of at least 3.00 for all undergraduate work.
3. A GPA of at least 3.00 in all graduate level work.
4. A combined score of 300 in the quantitative and verbal sections of the Graduate Record Examination (GRE).
5. Be recommended for doctoral work by the department.
6. Satisfy the School of Graduate Studies’ English Language Proficiency requirements.
7. Students with a bachelor’s degree may apply directly to the Ph.D. program and must include within their application:
   a. At least one letter of recommendation that comments on their research ability, and
   b. A sample of their previous research, or, provide a research topic proposal and how that research will be executed, completed, and presented within the first year of the Ph.D. program.
8. In rare circumstances, students who begin the M.S. program in Atmospheric Sciences may bypass the M.S. and be admitted into the Ph.D. program with a unanimous recommendation by the departmental faculty and by first satisfying all other Ph.D. admission requirements of the UND School of Graduate Studies and Atmospheric Sciences Department including #7 above. Application materials should be submitted to the Graduate Committee in the Department of Atmospheric Sciences. The student need not have completed their M.S coursework at the time of application. The student would then be subject to the additional degree requirements stated in section 6 of “Degree Requirements” below.

Degree Requirements
Students seeking the Doctor of Philosophy degree through the Department of Atmospheric Sciences at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Department of Atmospheric Sciences. These degree requirements include:

1. Completion of 90 semester credits beyond a bachelor’s degree or 60 semester credits beyond a master’s degree.
2. Two consecutive years of full-time academic work completed in residence at the University of North Dakota campus. With approval of a student’s Faculty Advisory Committee, one of these years may be completed through full-time academic work and/or research at another institution or location.
3. At least 40 of the post-bachelor’s credits or 27 of the post-master’s credits must be formal coursework. A minimum of two-thirds of these credits must be taken in the Atmospheric Sciences department.
4. Up to 9 credits may be taken through distance education.
5. Completion of ATSC 500 Introduction to Atmospheric Research and ATSC 505 Advanced Atmospheric Dynamics or equivalent classes.
6. Students who have been admitted under admission requirements #7 or #8 above must successfully present research in written and oral form during their first year of the Ph.D. program, subject to approval by the Departmental Graduate Committee and the student’s Doctoral Committee. Those students approved will finish coursework and progress toward comprehensive exams and Ph.D. candidacy while those not approved will be dismissed.
7. Satisfactory completion of a written and oral doctoral comprehensive examination in Atmospheric Sciences is required before advancement to Ph.D. candidacy is granted. Students may attempt the written comprehensive exam twice.
8. Students are required to complete independent research that culminates in a dissertation, a public departmental seminar, and final examination.

Master of Science in Atmospheric Sciences

Admission Requirements

1. A four-year bachelor’s degree from a recognized college or university. For U.S. degrees, accreditation must be by one of the six regional accrediting associations.
2. Completion of a minimum of 20 semester credits of appropriate undergraduate work, e.g., physics, mathematics, chemistry, engineering, and/or atmospheric science.
3. A cumulative GPA of at least 2.75 for all undergraduate work or a GPA of at least 3.00 for the last two years.
4. Scores on the general portion of the Graduate Record Examination (GRE).
5. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as listed in the graduate catalog.

Applicants will be evaluated on an individual basis and those with limited backgrounds in the aforementioned areas (physics, mathematics, chemistry, and atmospheric science) but with a distinguished record in other disciplines may be accepted on a qualified basis with the understanding that deficiencies would be remedied early in the program.

Degree Requirements
Students seeking the Master of Science degree through the Department of Atmospheric Sciences at the University of North Dakota must satisfy all general degree requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Department of Atmospheric Sciences.
The Master of Science program requires that students complete a minimum of 30 credit hours. Approval of the thesis option will be granted based upon alignment of research interests with departmental faculty’s research interests and faculty availability. The non-thesis option requires the student to independently investigate a topic related to the major field and successfully complete a written comprehensive examination. This study need not be an original contribution to knowledge, but may be a presentation, analysis, and discussion of ideas already in the literature of the field. This non-thesis requirement ensures that students can investigate a topic and organize a scholarly report.

**Required Courses:** All students are required to complete at least one course from each of the core areas listed below in addition to completing ATSC 500 Introduction to Atmospheric Research. Non-thesis option students must also complete two credits of ATSC 997 Independent Study Report (Non-Thesis Option), and thesis option students must also complete 4-9 credits of ATSC 998 Thesis. A minimum of 21 credits must be from classroom courses (ATSC 575 or lower) for the thesis option and a minimum of 24 credits for the non-thesis option.

**ATSC 500** Introduction to Atmospheric Research

Select one of the following (Dynamics):

- ATSC 505 Advanced Atmospheric Dynamics
- ATSC 518 Advanced Synoptic Meteorology
- ATSC 548 Advanced Mesoscale Dynamics

Select one of the following (Physical):

- ATSC 450 Introduction to Cloud Physics Meteorology
- ATSC 520 Atmospheric Chemistry
- ATSC 525 Atmospheric Radiation
- ATSC 555 Advanced Surface Transportation Weather
- ATSC 560 Boundary Layer Meteorology
- ATSC 565 Air Quality

Select one of the following (Climate Systems):

- ATSC 510 General Circulation
- ATSC 515 Advanced Climatology
- ATSC 538 Advanced Earth System Sciences
- ATSC 545 Hydrometeorology
- ATSC 550 Tropical Meteorology

Select one of the following (Tools):

- ATSC 441 Radar Meteorology
- ATSC 528 Atmospheric Data Analysis
- ATSC 530 Numerical Weather Prediction
- ATSC 535 Measurement Systems
- ATSC 540 Statistical Methods in Atmospheric Science
- ATSC 552 Satellite Meteorology
- ATSC 553 Advanced Satellite Meteorology

Select one of the following (Thesis or Independent Study):

- ATSC 997 Independent Study Report (Non-Thesis Option)
- ATSC 998 Thesis

**Courses taken at the undergraduate level cannot be repeated for graduate credit.**

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**Combined Degree Program B.S./M.S. in Atmospheric Sciences**

The Atmospheric Sciences program offers a combined B.S./M.S. in Atmospheric Sciences program. The intent of the combined program is to allow qualified students to complete the requirements for both degrees in one year beyond that required to receive the Baccalaureate degree. Students may be accepted into this program upon completion of 90 credits toward the Bachelor’s degree and must apply prior to their fourth year of academic work. All requirements for both degrees must be met, and up to eight credits of prior-approved coursework may be double-counted toward each of the two degrees. Double-counted credits may not include required courses for the B.S. degree, but may include appropriate elective coursework.

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**Admission Requirements**

Admission requirements for the M.S. in Atmospheric Sciences, with the following additional criteria:

1. 3.0 GPA overall.
2. Completion of 90 credit hours prior to year four, including a course in dynamic meteorology.

**Degree Requirements**

Degree requirements for the M.S. in Atmospheric Sciences, with the following additional criteria:

1. Up to 8 credits of graduate-level coursework can be double counted for the B.S. and M.S. degrees. These credits can only be taken after admission to the graduate program.
2. The B.S. and M.S. degrees will be awarded sequentially upon completion of the degree requirements.

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**Aviation**

M.S. in Aviation (p. 337)

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**AVIT Courses**

**AVIT 501. General Issues in Aviation/Aerospace. 3 Credits.**

This course is designed to introduce students to graduate school, library resources, and faculty research interests. Students will explore the historical, current and future issues related to their own interest areas in the aerospace industry, F.S.

**AVIT 502. Aviation Economics. 3 Credits.**

An in-depth examination of the economic aspects of the air transportation industry, with microeconomic analysis applied to decision making in the airline, general and corporate aviation, and airports. Topics include: basic economics of air transport supply and demand; demand forecasting; cost drivers; yield, revenue and capacity management; regulatory issues; political influences; and unique economic characters of international commercial aviation.

**AVIT 503. Statistics. 3 Credits.**

This course is an in-depth study of inferential statistics with emphasis on the analysis of variance models and subsequent comparison procedures. In addition, the course will include coverage of correlation and multiple regression techniques as data analytic tools. Also, coverage of survey construction and analysis of survey data will be presented. Course content will be presented within the context of aviation and psychology examples. (Psychology 541: Advanced Univariate Statistics can be substituted for AVIT 503). Prerequisite: An introductory statistics course or calculus course.

**AVIT 504. Research Methods. 3 Credits.**

Methods and procedures of development, design and analysis related to aviation industry research. Topics include problem identification, review of literature, research design, and data analysis. This course is designed to give an overview of quantitative, qualitative and mixed-method approaches research design. The course includes the experience of critically evaluating research projects and developing a research project based on the principles discussed in class. Prerequisites: AVIT 501, and AVIT 503 or PSYC 541. F.

**AVIT 505. Qualitative Research Methods. 3 Credits.**

Examination and analysis of qualitative research design with particular emphasis on approaches relevant to problems in Aerospace Studies or related fields. Students will design a qualitative research project.

**AVIT 506. Quantitative Research Methods. 3 Credits.**

The purpose of this course is to provide students the opportunity to acquire knowledge and skills necessary to apply quantitative research methods in research. Students will design a quantitative research project. Prerequisite: A graduate level Statistics course.

**AVIT 507. Advanced Research Methods. 3 Credits.**

This course will be a thorough discussion of the different methodologies utilized in theoretical and applied research. Experimental and quasi-experimental design, and topical areas of survey methodology data mining, simulations, and techniques for dissertation designs. Prerequisites: AVIT 503, AVIT 505, and AVIT 506.
AVIT 510. Aviation Public Policy and Regulations. 3 Credits.
This course will examine and discuss the initiation, formulation and implementation of public policies that affect the various segments of the aviation industry. Various regulatory areas within the aviation industry, such as scheduled air carriers, general aviation, airport operations, air traffic management, and international agreements, will be analyzed. On demand.

AVIT 511. Aviation Information Technology. 3 Credits.
This course is an introduction to information systems essential to an aviation business professional. It will provide an overview of current and emerging technologies in various database, data communication and e-commerce systems.

AVIT 512. Aviation Environmental Issues. 3 Credits.
This course examines current environmental issues within the aviation industry in the context of historical environmentalism, current laws and regulations, and emerging research findings. A broad survey of earth systems precedes a focused examination of contemporary aviation environmental issues.

AVIT 513. Aviation Safety Management Systems. 3 Credits.
An in-depth study of aviation safety management concepts and principles as they relate to effective safety programs within the airlines, corporate aviation, general aviation and airports.

AVIT 514. Aviation Management Theory. 3 Credits.
An in-depth review of organizations in the aviation industry, their structures, environments and leadership as it relates to human behavior. Topics include organizational design, climate and the interactions with individuals, groups, and different organizational structures within the airline, general aviation, corporate aviation and airport organizations.

AVIT 515. Human Factors and Ergonomics: Human Perceptions in Information Systems Design. 3 Credits.
Human perception and information processing will be discussed in relation to information system design requirements to optimize human performance. The Ergonomics components will highlight human-centered design of equipment, devices and processes that conforms to the human body (anthropometry) and its cognitive abilities within the aviation/aerospace environment. Topics include information systems design with regard to compatibility, perception, attention, situation awareness and decision processes. Applications to current workstation design will allow students to have a greater understanding of human centered design goals. On demand.

AVIT 516. Training System Design. 3 Credits.
The process of memory, learning, and judgment will be related to instructional design strategies in the aviation industry, where heavy use of simulation is used in the training and evaluation of aviation professionals. Topics include instructional design and assessment concepts, simulation design and decision making skills. Class presentations include operational problem-solving group work as well as research paper reviews.

AVIT 517. Airline Labor Relations and Law. 3 Credits.
This course will examine and discuss the application and impact of the Railway Labor Act as it pertains to air carrier labor operations. Topics of study will include labor history, organization, alternative dispute resolution, collective bargaining, and emerging labor trends. On demand.

AVIT 518. Human Error. 3 Credits.
The objective of this course is to develop a deeper understanding of the human error and its impact upon human performance in variety of fields. Prerequisite: Graduate Admission, S.

AVIT 520. Strategic Airport Planning. 3 Credits.
This course will explore the elements of airport planning within the public administration domain. Emphasis will be placed on individual airport's strategic plans, how airports operate efficiently and effectively with changing regulations and economic fluctuations in the global marketplace.

AVIT 521. Ethics in Aerospace. 3 Credits.
The course will introduce ethical concepts and frameworks used in professional decision-making. Students will engage with faculty and outside speakers to weigh decisions in the applicable ethical frameworks. Students participation will include graded elements of formal case presentations, class discussion sessions, essay examinations and review of scholarly and trade journal articles. The course will have a strong emphasis on research project design to assess dynamics of ethical decision-making in different populations, as well as exploring educational opportunities in the aerospace industry.

AVIT 522. UAS Management. 3 Credits.
This course provides a series of lectures or presentations by visiting lecturers or faculty on various themes related to Unmanned Aircraft Systems (UAS). Prerequisite: Graduate Student Status, F, odd years.

AVIT 523. Aviation Safety Data Analysis. 3 Credits.
The objective of this course is to obtain an understanding of various safety programs conducted throughout the aviation industry and examine the underlying analytical techniques associated with each program. Prerequisite: Graduate student status. SS.

AVIT 524. Air Traffic Management. 3 Credits.
This course will explore the elements of Air Traffic and Next Gen. There will be a discussion on how air traffic control works and the evolution of the Air Traffic Management of the National Airspace System in the US and abroad. Emphasis will be on the current day issues and how Air Traffic Management is changing not only in the US but in Canada, Europe and worldwide. Prerequisite: Admission (or conditional admission) to the Aviation Master of Science, The Aerospace PhD program, or consent of the instructor. S, odd years.

AVIT 525. Legal Issues in Aviation. 3 Credits.
The course will introduce legal concepts and frameworks of the United States' legal system. Issues particular to the aviation industry will be discussed. Students will engage in formal case presentations and discussions to gain an understanding of the legal issues faced in the aerospace industry. Prerequisite: Admission (or conditional admission) to the Aviation Master of Science program, the Aerospace PhD program, or consent of the instructor. SS, even years.

AVIT 526. UAS and the Law. 3 Credits.
This course introduces students to the laws and policies governing UAS operations including flight regulations, remote sensing issues, and data and cybersecurity issues related to UAS. The class scope of inquiry includes US and international law and examines both civil and military use. On demand.

AVIT 587. Supervised Field Work. 1-3 Credits.
Used primarily for individualized field placement so that the student may acquire practical experiences in the aviation industry. Prerequisite: Consent of graduate director. Repeatable to 6 credits. S/U grading.

AVIT 590. Aviation Seminar. 1-3 Credits.
A series of lectures presented by visiting lecturers and the faculty. Repeatable to 9 credits.

AVIT 591. Readings in Aviation. 1-3 Credits.
Readings in selected Aerospace Studies topics, with written and/or oral reports. Prerequisite: Consent of instructor. Repeatable to 6 credits.

AVIT 593. Individual Research in Aviation. 1-3 Credits.
Individual student projects designed to develop advanced knowledge in a specific area of expertise. A written report is required. May be repeated for up to 6 credits for Master's and up to 12 credits for Ph.D. Repeatable to 6 credits.

AVIT 595. Aviation Capstone. 3 Credits.
The Capstone course integrates, extends and applies knowledge learned in earlier Aviation courses and research projects. The course also undertakes an in-depth study of management theories relevant to the aviation industry and how leaders apply these theories in practice. Students will have the opportunity to demonstrate their knowledge and leadership abilities by working in teams to design and develop a solution to a current aviation problem, which will be assigned by the instructor. This effort will culminate in an on-campus presentation to the faculty and invited industry experts. Prerequisite: AVIT 504 or permission of instructor.

AVIT 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

AVIT 997. Independent Study. 2 Credits.
Independent study and preparation of a written report. Prerequisite: Special Permission Only. On demand.

AVIT 998. Thesis. 4 Credits.
Preparation and defense of a thesis based on original research. Prerequisite: Admission committee approval and consent of instructor. Repeatable to 4 credits.

AVIT 999. Dissertation. 1-12 Credits.
An original research project approved by and completed under the supervision of a dissertation committee. Prerequisites: Graduate standing, approval, completion, and defense of dissertation proposal. Repeatable to 18 credits.
SPST Courses

SPST 500. Introduction to Orbital Mechanics. 3 Credits.
This course introduces students without much background in either mathematics or physics to the problems faced everyday by orbital analysts as they track the 7000 satellites which orbit the earth. The course gives the students an ability to converse, as managers and co-workers, with those individuals who are calculating these difficult orbits. This appreciation is important in both the civilian and military sides of the space program. On demand.

SPST 501. Survey of Space Studies I. 3 Credits.
SPST 501 is the first course in a two-course sequence (along with SPST 502) in Space Studies that introduces new students to essential knowledge that will be necessary to successfully complete their M.S. degree in space studies. SPST 501 consists of the following six modules: 1) space history, 2) space policy, 3) space law, 4) planetary and space sciences, 5) space life sciences and human factors, and 6) Earth remote sensing. All modules contain foundational information that will give students the basic knowledge and skills necessary to achieve a broad understanding of the multi- and interdisciplinary nature of space studies; knowledge that can be applied in later courses, such as Capstone; and knowledge that facilitates thesis and other specialized types of instruction and research. Course content in SPST 501 will also be used to assess student learning at the end of their M.S. program via the Comprehensive Examination. Students are expected to master and understand course content, be able to apply course content as appropriate, and demonstrate their understanding of course content prior to graduation. F.

SPST 502. Survey of Space Studies II. 3 Credits.
SPST 502 is the second course in a two-course sequence (along with SPST 501) in Space Studies that introduces new students to essential knowledge that will be necessary to successfully complete their M.S. degree in space studies. SPST 502 consists of the following five modules: 1) space mission design (two modules), 2) orbital mechanics, 3) launch vehicles and propulsion, and 4) robotic spacecraft instrumentation. All modules contain foundational information that will give students the basic knowledge and skills necessary to achieve a broad understanding of the multi- and interdisciplinary nature of space studies; knowledge that can be applied in later courses, such as Capstone; and knowledge that facilitates thesis and other specialized types of instruction and research. Course content in SPST 502 will also be used to assess student learning at the end of their M.S. program via the Comprehensive Examination. Students are expected to master and understand course content, be able to apply course content as appropriate, and demonstrate their understanding of course content prior to graduation. S.

SPST 504. Research Methods in Space Studies. 3 Credits.
This course will provide an introduction to research in Space Studies, emphasizing the preparation of a Ph.D. proposal and the dissertation itself. Course content will be tailored to address the specific research methods applicable to the student(s) research interests. Typically given by the student’s advisor, but students preparing in the same area (e.g., Planetary Science, Astronomy) may be in a combined section. On demand.

SPST 505. Spacecraft Systems Engineering. 3 Credits.
This course will guide the students through the spacecraft design and proposal process for an actual mission. In this course the students will work in teams on individual spacecraft subsystems, participate in an engineering design review, and create a document which can be submitted for funding for a small satellite project. Lectures will provide an overview of the separate spacecraft subsystems involved in a typical mission, the systems engineering approach to spacecraft development, and the grant writing process. Distance students will interact with on-campus students via conferencing software. Prerequisite: SPST 405 or consent of instructor.

SPST 506. Advanced Orbital Mechanics. 3 Credits.
This course provides a working knowledge of the field of orbital mechanics including the use of appropriate mathematical and computational techniques, the analysis of professional papers in orbital mechanics, and applying the appropriate techniques to solve orbital mechanics problems. Topics covered include orbital elements, perturbations, coordinate systems, orbit determination, and multi-body gravitational problems. Prerequisites: SPST 500, and MATH 266 or equivalent.

SPST 508. Quality Engineering for the Space Industry. 3 Credits.
This course addresses the principles and techniques for establishing quality goals, identification of customer needs and requirements, measurement of quality, and product/process engineering to improve system performance with a focus on the space industry. The main objectives are to provide the student with an understanding of the principles and practice of quality and reliability engineering in general and to provide an in-depth understanding of the quality assurance concepts, strategies, and tools practiced in the space industry. Familiarity with the techniques learned in this course will enable the student to address problems in the design, implementation, measurement, and correction of production and service systems found in the space industry. On demand.

SPST 512. Human Performance in Extreme Environments. 3 Credits.
This course identifies the impact that the stressors of extreme environments have on human performance. The course objectives are to highlight the differences and similarities among extreme environments and to demonstrate that, despite the differences lessons learned from operations in a given extreme environment can be effectively applied to other environments. Although settings such as space, mountains, or deep sea exhibit unique characteristics, the human physiological and psychological reactions and adaptations to these extreme settings stay similar. On demand.

SPST 515. Human Factors in Space. 3 Credits.
This course is a review of the major stresses experienced by humans on entering the space environment. The course objectives include investigation of the psychological and physiological effects experienced by U.S. and Russian space crews, with an emphasis on longer flights. The examination of the avoidance and mitigation of these stresses is an essential need in the future development of human spaceflight. On demand.

SPST 517. Human Spaceflight Systems. 3 Credits.
This course is designed to introduce students to human space systems. The course uses both an engineering and a historical approach to human spaceflight systems covering all manned spacecraft up to today, plus individual subsystems necessary for human occupation. By the end of the course, students will: 1. Understand the engineering and science concepts related to human spaceflight, 2. Understand the major technologies required for human spaceflight, 3. Apply the systems engineering process to a human spaceflight mission: a. Describe the interactions among the elements of a space mission, b. Describe the interactions among all spacecraft subsystems, c. Document design decisions and analysis in a clear and concise manner. F, even years.

SPST 519. Closed Ecological Systems for Life Support. 3 Credits.
The course covers the multiple interactions of human/bioregenerative life support based on physical/chemical regeneration (hybrid) life support environments. The course devotes specific attention to the limits of stability for closed material cycles functioning during long-term remote confined missions. The importance of the human factor as a target link, main sensor, and main integration and control element for the system is considered as providing significant self-sustainability. Advanced scenarios for space life support based on ecological and in situ resource utilization approaches are discussed. On demand.

SPST 520. Asteroids, Meteorites and Comets. 3 Credits.
The small bodies of the solar system provide clues to the origin and early history of the solar system. The planets and larger moons have all been chemically transformed erasing their records of their formation. By contrast, many asteroids, meteorites and comets are essentially unmodified from the time of their origin 4.5 billion years ago and thus preserve a record of the formation epoch. Each of these classes of objects is investigated separately, and relationships between them are examined. Implications for impact hazards and for extraterrestrial resources are also explored. The results of recent and current spacecraft missions to asteroids (e.g., Galileo, NEAR, DAWN, Hayabusa, Rosetta, OSIRIS-Rex, etc.) and to comets (e.g., Giotto, Vega 1, Stardust, Deep Impact, Rosetta, etc.) are reviewed. On demand.
SPST 521. The Planet Mars. 3 Credits.
This course provides an in-depth review of the present state of our knowledge of the planet Mars. Topics that are covered include: the origin and evolution of the planet, the surface geology and geological processes, the geophysical properties of the Martian interior, the origin and evolution of the Martian atmosphere, the present and past climates of Mars, the Martian moons, and the possibility of past or present life on Mars. The American, Soviet/Russian and other nations’ Mars exploration programs are reviewed and the course incorporates the most recent results from spacecraft missions such as Mars Odyssey, the Mars Exploration Rovers (Opportunity Spirit), Mars Express (European Space Agency), Mars Reconnaissance Orbiter, Mars Science Laboratory (Curiosity Rover), MAVEN, and Mangalyaan (India’s Mars Orbiter Mission). Potential future manned and unmanned missions are also discussed. On demand.

SPST 522. Remote Sensing Principles. 3 Credits.
This course covers the basic concepts and foundations of remote sensing, a review of major Earth observing satellite and aircraft platforms, and an investigation of flow of data from satellite to Earth, what it represents, and how to interpret it, using both visual and digital image processing techniques. A field visit to the EROS Data Center in Sioux Falls may also be arranged.

SPST 523. Remote Sensing Applications. 3 Credits.
This course covers the use of advanced image processing algorithms and information extraction techniques for various Earth resource applications such as land cover/land use, environmental change detection, geology, oceanography, agriculture, forestry, rangeland, water resources, urban planning, natural disaster management, etc. Prerequisite: SPST 522.

SPST 524. Current Topics in Astrobiology. 3 Credits.
This is a multi-disciplinary, literature-intensive examination of astrobiology, which is the study of life in the universe. Students will read scientific research and review papers from a variety of disciplines including astronomy, planetary science, chemistry, biology, and geology. Course goals include: developing proficiency at reading/analyzing diverse scientific papers, developing the ability to incorporate knowledge from multiple disciplines in the study of astrobiological research, and developing the ability to effectively write summary papers to show basic understanding of course material. Prerequisite: SPST 460 or consent of instructor. On demand.

SPST 525. Technical Issues in Space. 1-3 Credits.
An examination of the technological base for the exploration and development of space. An understanding of this technology and of its impact is essential to an understanding of the issues and problems associated with our continuing efforts to explore and settle this new frontier. May be repeated if the topic is different. Repeatable.

SPST 526. Advanced Observational Astronomy. 3 Credits.
An advanced course that utilizes UND Observatory’s full wavelength range capabilities to obtain data from a variety of celestial objects with the key goal of learning appropriate ways to reduce and interpret observational data. In particular, the course will focus on visible-wavelength stellar spectroscopy, near-infrared reflectance spectroscopy, solar astronomy, radio astronomy, and color imaging. Students will also engage in reading professional literature for each sub-discipline and prepare a mock publication using data obtained during the course. Learning outcomes and objectives for this course include: 1) Students will be able to locate and observe astronomical objects and reduce data, 2) Develop analytical skills and the ability to interpret observational data, 3) Gain experience with measurement techniques and equipment, and develop the ability to assess uncertainties and assumptions, 4) Communicate professionally, in writing, the results of their observational endeavors, and be able to understand scientific ideas by reading published professional journal articles, 5) Students will be able to understand scientific ethical practices and demonstrate them in the conduct of scientific research, and 6) Students will be able to conduct astronomical research under the direction of the professor, which will ultimately contribute to the generation of new knowledge as it will prepare them to do this professionally. Prerequisites: SPST 425 and MATH 165 or consent of instructor. On demand.

SPST 527. Extraterrestrial Resources. 3 Credits.
This course focuses on the inventory, accessibility, acquisition, processing and utilization of extraterrestrial resources (space resources) from celestial bodies such as the Moon, Mars, asteroids and comets. Consideration will be given to extraterrestrial resources for in situ utilization (such as a Lunar or Martian base), for space operations (such as supporting large scale near-Earth activities or a human Mars mission), and for terrestrial markets. The course will focus on the interplay between the scientific, technical, and economic aspects of acquiring and utilizing such resources. The course will also explore some of the legal and political ramifications and limitations of claiming and recovering space resources. On demand.

SPST 528. Space Environment and the Sun. 3 Credits.
This course will provide an in-depth study of the science and observations of the Sun, space weather, and effects of the Sun on astronauts, Earth, and the space environment. Topics that will be covered include the solar photosphere and active surface phenomena such as sunspots, flares, and coronal mass ejections; the nature of the quiet Sun; the solar interior and helioseismology; space weather and impact of solar particles on the space environment and Earth; the hazards posed to astronauts by solar eruptions; common techniques of solar observations; and a review of the primary types of solar instrumentation and the observatories that currently study the Sun. Students will be able to observe the Sun using the UND Observatory’s small solar telescopes; all students will have the opportunity to analyze solar datasets to aid their understanding of the Sun. Prerequisite: MATH 165 or consent of instructor. On demand.

SPST 540. Space Economics and Commerce. 3 Credits.
A study of the economic aspects of space activities, with analysis of the possibilities and the barriers. Key areas include launch services, satellite communications, remote sensing, microgravity materials processing, and interaction with the government. Global competition against subsidies or government-sponsored entities is examined. On demand.

SPST 541. Management of Space Enterprises. 3 Credits.
This course investigates the management of space organizations. These include organizations that are public and private, RD and operations, profit and non-profit. You will learn the basics of management theory, the history of systems management, and the technical issues that must be considered in the management of space RD and operations. On demand.

SPST 542. Risk Management of Space Organizations. 3 Credits.
This course includes a systematic approach to the principles and practices of risk management in the space industry from project initiation through planning, implementation, control and closeout. It discusses various techniques and models for qualitative and quantitative risk assessment and risk mitigation in such areas as cost, schedule, and performance. Decision making under conditions of uncertainty and risk is also discussed. On demand.

SPST 545. Space and the Environment. 3 Credits.
This course is an advanced graduate-level review of international relations theories, policies, and laws as applied to the international implications of global commons. This course introduces the concept of global commons, examines the theories and practices concerning management of global commons, and analyzes the global commons dealing with the challenges of collective action as applied to global, orbital, and planetary environmental changes. On demand.

SPST 551. History of the Space Age. 3 Credits.
This course introduces students to the history of human endeavors in space. These include the development of rocketry, the influence of amateur societies and science fiction, the military development of ballistic missiles, and human and robotic spaceflight.

SPST 552. History of Astronomy and Cosmology. 3 Credits.
This course investigates the history of human endeavors to understand the stars, planets, and cosmos as a whole from a scientific perspective. It covers the early observations and theories of the Babylonians and Greeks through the European Scientific Revolution, and finally to the development of astrophysics and modern cosmology using space vehicles. On demand.

SPST 555. Military Space Programs. 3 Credits.
An introduction to military uses of space by the United States, Russia, and other nations. The course introduces ballistic missiles, anti-ballistic missile and anti-satellite systems, space-based reconnaissance and intelligence-gathering, communications, navigation, acquisition, and military space treaties. On demand.
SPST 560. Space Politics and Policy. 3 Credits.
This course serves as a graduate-level introduction to the field of Public Policy as applied to Space Policy. The course surveys the evolution of Space Policy at several levels of analysis including context, political actors and institutions, political processes, and policy outcomes, and assesses the symbiotic relationship between policy, technology, and science. On demand.

SPST 561. Public Administration of Space Technology. 3 Credits.
This course is an advanced graduate-level review of Public Administration theories as applied to the implementation of space technology programs. In this course, the political, organizational, and technical variables that affect the management processes of space organizations are examined. Prerequisite: SPST 560 or SPST 541. On demand.

SPST 565. Space Law. 3 Credits.
This course serves as a graduate-level introduction to the field of Law as applied to Space Law. The course examines the origins and evolution of the laws of outer space from the beginnings of the space age to the present. International laws governing access and use of space, and national laws regulating governmental and commercial activities in space are reviewed and analyzed. On demand.

SPST 570. Advanced Topics in Space Studies. 1-3 Credits.
Lecture, discussion and readings on advanced topics of current interest. May be repeated if the topic is different. Repeatable.

SPST 574. Remote Sensing in Developing Countries. 3 Credits.
This course will introduce students to remote sensing programs in developing countries and typical remote sensing application areas pertinent to developing countries, such as: potable water, forest fires, vector diseases, environmental degradation, food security, fisheries, floods, droughts, crop pests, etc., with case studies. Prerequisite: SPST 522 or GEOG 475 or consent of instructor. On demand.

SPST 575. Remote Sensing Law and Policy. 3 Credits.
This course focuses on the evolving laws, policies, and institutions that have long-term ramifications for earth observations. Some topics addressed are the United Nations Principles on Remote Sensing, the U.S. Land Remote Sensing Policy Act of 1992, the commercialization of remote sensing activities, as well as manned and unmanned aerial remote sensing systems and their intersection with criminal and civil law. The course will also analyze current and developing remote sensing law, regulations, and technological capabilities, and their implications for both legal and cultural conceptualizations of privacy. At the U.S. domestic level, this will involve 4th Amendment jurisprudence, privacy laws, and case law. On demand.

SPST 581. Field Visit to Space Centers. 1-3 Credits.
This course will provide a first-hand knowledge of selected space centers in the U.S. and/or abroad through an organized field visit. The field visit will be led by a space studies faculty and will include prior preparation through readings, class seminars, lectures and written assignments. May be repeated up to a maximum of 3 credits. Repeatable to 3 credits. S/U grading. On demand.

SPST 590. Space Studies Colloquium. 1 Credit.
A series of lectures presented by visiting lecturers and faculty. May be repeated for up to 2 credits. S/U grading.

SPST 591. Readings in Space Studies. 1-3 Credits.
Readings in selected Space Studies topics, with written and/or oral reports. Repeatable to a maximum of 6 credits. Prerequisite: Consent of instructor. Repeatable to 6 credits.

SPST 593. Individual Research in Space Studies. 1-3 Credits.
Individual student projects designed to develop advanced knowledge in a specific area of expertise. A written report is required. May be repeated for up to 6 credits for Master's and up to 12 credits for Ph.D. Repeatable to 6 credits.

SPST 595. Space Studies Capstone. 3 Credits.
The capstone course integrates, extends and applies knowledge gained in earlier Space Studies courses and reading. The major component of this course is a collaborative team project inter-relating policy, technology and science. This course is required for students who select the non-thesis option and can be taken after completing at least 25 credits in the program or completion of the curriculum breadth requirements. The course concludes with a required week-long capstone experience on the UND campus in the spring. Prerequisites: SPST 501, SPST 502, SPST 997, Comprehensive Exam, Graduate school status, and a GPA of 3.0 or higher. Prerequisite or Corequisite: Will graduate in the calendar year; either in Spring, Summer, or Fall semesters. F.

SPST 996. Continuing Enrollment. 1-12 Credits.
Prerequisite: Department consent. Repeatable. S/U grading.

SPST 997. Independent Study Report. 2 Credits.
Independent study and preparation of a written report for students taking the non-thesis option in the Master's program.

SPST 998. Thesis. 1-6 Credits.
An original research project approved by and completed under the supervision of a thesis committee. Prerequisites: Graduate standing in Space Studies and completion and approval of a thesis proposal (see department for approval). Repeatable to 6 credits.

SPST 999. Dissertation. 1-12 Credits.
An original research project approved by and completed under the supervision of a dissertation committee. Prerequisites: Graduate standing, approval, completion, and defense of dissertation proposal. Repeatable to 18 credits. F,S,SS.

Undergraduate Courses for Graduate Credit

SPST 405. Space Mission Design. 3 Credits.
A team design project to develop the requirements for a space mission. The specific mission will vary from time to time. Design teams will work on selected portions of the mission. Accompanying lectures will provide background material. Prerequisite: SPST 200. S.

SPST 410. Life Support Systems. 3 Credits.
A review of the physiological effects of living in space including a discussion of current and near-term life support systems equipment for the provision of oxygen, water, food, and radiation protection. In addition, a review will be made of the issues associated with the development of fully closed ecological life-support systems that will be essential to the long-term development of space. Prerequisite: SPST 200. On demand.

SPST 425. Observational Astronomy. 3 Credits.
This course explores aspects of observational astronomy including monochromatic imaging, astrometry, and photometry. Basic observing techniques, astronomical equipment, characteristics of the night sky, data reduction, interpretations, as well as image processing techniques will be taught. Students will learn to operate a remotely controllable Internet telescope and CCD camera. A broadband Internet connection is recommended. Night observing is required. Prerequisite: PHYS 110. S.

SPST 450. International Space Programs. 3 Credits.
This course will introduce students to the major governmental space programs around the world. The history, activities and future directions of the Russian/Soviet, European/ESA, Chinese, Japanese, Indian and other space programs will be explored. International collaborations between the various programs will also be studied. Prerequisite: SPST 200. On demand.

SPST 460. Life in the Universe. 3 Credits.
This course examines the nature and evolution of life on Earth from its origin to the present time in the context of cosmological evolution, chemical evolution, planetary evolution, biological evolution, and cultural evolution. The possibility of life elsewhere in the universe is considered based on the conditions under which life could arise and flourish. Human changes to the Earth are placed within this context. The future of life on Earth is discussed and the social and cultural implications arising from the discovery of extraterrestrial life are explored. On demand.

Master of Science in Aviation

Admission Requirements

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. Bachelor’s degree in Aviation/Aeronautics or Bachelor’s degree from an accredited institution—a minimum of 20 semester credits of appropriate aviation related undergraduate work.
2. Graduate Record Examination, General Test.
3. Overall undergraduate GPA of 2.75 or a GPA of at least 3.00 for the last two years of undergraduate work.
4. Aviation industry experience, which can include any Federal Aviation Administration (FAA) certificates (pilot, mechanic, air traffic, dispatch, ground, etc.) or applied aviation industry knowledge.
5. Students must submit a 2-3 page paper answering specific questions per departmental guidelines. One of the questions will address the potential thesis or independent study topic. Students that do not possess an FAA certificate must submit a 2-3 page paper/resume outlining their aviation industry experience.

6. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

**Degree Requirements**

1. A minimum of 30 credits including a 4-credit thesis. In the event a thesis is unable to be completed, an independent study option is available by special permission by the Graduate Director. In that case, a minimum of 32 credit hours which includes comprehensive exams and a 2-credit independent study.

2. If the independent study option is approved, comprehensive exams are required prior to beginning the independent study.

3. Required courses include AVIT 501, AVIT 503 Statistics, 504 Research Methods, AVIT 998 Thesis or AVIT 997 with special permission, and AVIT 595 Capstone.

4. In addition to the required courses, students will select elective courses from the Course Catalog.

5. Follow the Graduate Catalog and Graduate Student Handbook, Master's Degree for completion of:
   a. Program of Study
   b. Advisor Selection
   c. Independent Study/Thesis Option
   d. Topic Proposal

6. AVIT 590 Aviation Seminar and AVIT 593 Individual Research in Aviation can be taken with permission from a sponsoring faculty member.

7. Must have an overall Grade Point Average (GPA) of 3.0

**Aviation Safety Specialization**

The Master of Science program offers an area of specialization in Aviation Safety. In order to receive this specialization:

1. Be fully admitted to the UND School of Graduate Studies and be in good academic standing in the MS-Aviation program;

2. Successfully complete 9 credits of AVIT coursework in the area of Aviation Safety from the course list below. AVIT 590 (Aviation Seminar) courses relevant to Aviation Safety and other relevant UND Graduate Courses may be approved to count towards the Aviation Safety Specialization with permission from the Graduate Director.

3. Course List
   a. AVIT 514 Aviation Management Theory (3)
   b. AVIT 502 Aviation Economics (3)
   c. AVIT 500 Strategic Airport Planning (3)
   d. AVIT 524 Air Traffic Management (3)

**Human Factors Specialization**

The Master of Science program offers an area of specialization in Human Factors. In order to receive this specialization:

1. Be fully admitted to the UND School of Graduate Studies and be in good academic standing in the MS-Aviation program;

2. Successfully complete 9 credits of AVIT coursework in the area of Human Factors from the course list below. AVIT 590 (Aviation Seminar) courses relevant to Human Factors and other relevant UND Graduate Courses may be approved to count towards the Human Factors Specialization with permission from the Graduate Director.

3. Course List
   a. AVIT 515 Human Factors and Ergonomics (3)
   b. AVIT 516 Training System Design (3)
   c. AVIT 518 Human Error (3)

**Domestic Air Law Specialization**

The Master of Science program offers an area of specialization in Domestic Air Law in collaboration with the UND School of Law. In order to receive this specialization:

1. Be fully admitted to the UND School of Graduate Studies and be in good academic standing in the MS-Aviation program;

2. Have completed AVIT 501 General Issues in Aviation/Aerospace and AVIT 503 Statistics and be in their second year of the MS-Avit program;

3. Receive permission from the Aviation Graduate Program Director;

4. Successfully complete 9 credits of coursework in the UND School of Law including:
   a. LAW 210 , and;
   b. 6 credits from the following:
      c. LAW 212 ___ 3
      LAW 214 ___ 3
      LAW 263 ___ 3
      LAW 282 ___ 2
      LAW 291 ___ 1-4
      LAW 299 ___ 2

Note: Law courses available on-campus only (not available via distance education).

**Biology**

M.S. in Biology (p. 342)

Ph.D. in Biology (p. 342)

**Courses**

BIOL 503. Seminar. 1 Credit.

Discussion of selected topics in advanced biology, a different topic each semester. Repeatable to 6 credits.
BIOL 505A. Biological Inquiry for Teachers. 3 Credits.
First of general biology course sequence intended for teachers planning to qualify to teach high school biology, or teachers looking to enrich their content knowledge in biology for professional development. Topics will include energy conversion, cell and molecular biology, genetics, physiology, evolution, ecology, and pedagogical issues. May not be used in Ph.D. or Master's programs. Prerequisite: BIOL 505L. On demand.

BIOL 505B. Biological Inquiry for Teachers. 3 Credits.
First of general biology course sequence intended for teachers planning to qualify to teach high school biology, or teachers looking to enrich their content knowledge in biology for professional development. Topics will include energy conversion, cell and molecular biology, genetics, physiology, evolution, ecology, and pedagogical issues. May not be used in Ph.D. or Master's programs. Prerequisite: BIOL 505A.

BIOL 505L. Biological Inquiry for Teachers Laboratory. 2 Credits.
This hands-on lab course complements BIOL 505 and is intended for teachers planning to enrich their practical skills in biology for professional development. May not be used in Ph.D. or Master's programs. Prerequisite: Must be licensed K-12 teacher.

BIOL 506A. Ecology for Teachers. 3 Credits.
Second of a general biology course sequence intended for teachers planning to qualify to teach high school biology, or teachers looking to enrich their content knowledge in biology for professional development. Topics will include physiological ecology, behavioral ecology, population ecology, community ecology, landscape ecology, geographical ecology, global ecology and pedagogical issues. May not be used in Ph.D. or Master's programs. Prerequisite: BIOL 506L.

BIOL 506B. Ecology for Teachers. 3 Credits.
Second of a general biology course sequence intended for teachers planning to qualify to teach high school biology, or teachers looking to enrich their content knowledge in biology for professional development. Topics will include physiological ecology, behavioral ecology, population ecology, community ecology, landscape ecology, geographical ecology, global ecology and pedagogical issues. May not be used in Ph.D. or Master's programs. Prerequisite: BIOL 506A.

BIOL 506L. Ecology for Teachers Laboratory. 2 Credits.
This hands-on lab course complements BIOL 506 and is intended for teachers planning to enrich their practical skills in biology for professional development. May not be used in Ph.D. or Master's programs. Prerequisites: BIOL 506L and BIOL 505B.

BIOL 507A. Cellular and Molecular Biology for Teachers. 3 Credits.
Third of a general biology course sequence intended for teachers planning to qualify to teach high school biology, or teachers looking to enrich their content knowledge in biology for professional development. Topics will include cell, molecular, developmental and evolutionary biology. May not be used in Ph.D. or Master's programs. Prerequisite: BIOL 507L.

BIOL 507B. Cellular and Molecular Biology for Teachers. 3 Credits.
Third of a general biology course sequence intended for teachers planning to qualify to teach high school biology, or teachers looking to enrich their content knowledge in biology for professional development. Topics will include cell, molecular, developmental and evolutionary biology. May not be used in Ph.D. or Master's programs. Prerequisite: BIOL 507A.

BIOL 507L. Cellular and Molecular Biology for Teachers Laboratory. 2 Credits.
This hands-on lab course complements BIOL 507 and is intended for teachers planning to enrich their practical skills in biology for professional development. May not be used in Ph.D. or Master's programs. Prerequisite: Must be licensed K-12 teacher.

BIOL 509. Scientific Writing. 2 Credits.
Writing is an essential part of the scientific enterprise. In this course, students will develop their scientific writing skill through readings and discussion on the nature of effective writing, and through critique of writing projects produced by each student. Course can be repeated up to 4 credits for different writing projects. Prerequisite: Consent of instructor. Repeatable to 4 credits. F.

BIOL 512. Advanced Evolutionary Analysis. 2 Credits.
This course will focus on methods that reconstruct evolutionary histories of populations, species and higher-level taxa. The course will also discuss the evolution of specialized traits using appropriate analyses. Prerequisite: Consent of instructor. On demand.

BIOL 533. Grassland Ecology. 2 Credits.
Phytogeography, environmental influences, and community dynamics of grassland ecosystems with emphasis on herbage production, ecosystem modeling, and ecological characteristics of major grass species. Prerequisite: BIOL 332 or an equivalent approved by the department.

BIOL 534. Quantitative Ecology. 3 Credits.
An introduction to the methods employed in the study of the ecology of natural populations/communities of plants and animals.

BIOL 535. Physiological Ecology. 3 Credits.
Critical evaluation and synthesis of selected theoretical topics in physiological ecology. Prerequisite: BIOL 442 or consent of instructor. On demand.

BIOL 536. Advanced Population Biology. 3 Credits.
In this course we will examine current thinking on a range of topics in population ecology, population genetics and the links between ecological and evolutionary dynamics. Students will build on background reading by developing their own models of some aspect of population biology (ecological and/or genetic). Prerequisite: Consent of instructor. S, even years.

BIOL 571. Research Design and Statistical Analysis. 3 Credits.
Topics in scientific inference, research design, and current approaches to statistical analysis of data in biology and other studies of the natural world. Practical data analysis using commonly available software. Prerequisite: An introductory course in statistics. F.

BIOL 572. Design of Biological Experiments. 1 Credit.
Topics in designing biological experiments including the role of experimentation, inference, sampling, replication, controls, and power analysis. Corequisite: BIOL 470 or consent of instructor. F.

BIOL 590. Special Topics. 1-4 Credits.
Important and current topics in biology not covered by other courses. Repeatable when topics vary. Examples include: Aquaculture, Big Game Biology, Biorhythms, Conservation Biology, Fire Ecology, Molecular Techniques, Plant-Animal Interactions, Sex Determination and Speciation. Prerequisite: Graduate status or upper division status with consent of instructor. Repeatable.

BIOL 592. Directed Studies. 1-4 Credits.
Designed to meet the needs of individual and small groups of students in areas of faculty specialization. May be repeated to a total of 12 credits. Repeatable to 12 credits.

BIOL 593. Advanced Topics in Plant Biology. 1-4 Credits.
Advanced topics in plant biology. Examples include: Plant Development, Plant Biochemistry, and Plant Genetics. Repeatable when topics vary. Prerequisite: Graduate status or upper division status with consent of instructor. Repeatable. On demand.

BIOL 594. Advanced Topics in Genetics. 1-4 Credits.
Advanced topics in genetics. Examples include: Biochemical Genetics, Cytogenetics, and Human Medical and Population Genetics. Repeatable when topics vary. Prerequisite: Graduate status or upper division status with consent of instructor. Repeatable. On demand.

BIOL 595. Advanced Topics in Fisheries, Wildlife, and Conservation. 1-4 Credits.
Advanced topics in fisheries, wildlife or conservation biology. Examples include: Natural Resource Policy, Waterfowl Biology and Management, and Wetland and Prairie Ecology. Repeatable when topics vary. Prerequisite: Graduate status or upper division status with consent of instructor. Repeatable. On demand.

BIOL 596. Advanced Topics in Parasitology. 1-4 Credits.
Advanced topics in parasitology. Examples include: Arthropod Borne Diseases, Helminthology, Disease Biology, and Medically Important Arthropods. Repeatable when topics vary. Prerequisite: Graduate status or upper division status with consent of instructor. Repeatable. On demand.

BIOL 597. Advanced Topics in Physiology and Development. 1-4 Credits.
Advanced topics in physiology and development. Examples include: Comparative Endocrinology, Vascular Development, Embryonic Physiology, and Neural Physiology. Repeatable when topics vary. Prerequisite: Graduate status or upper division status with consent of instructor. Repeatable. On demand.

BIOL 599. Research. 1-15 Credits.
Intended for students conducting original research in consultation with staff. Repeatable. S/U grading.

BIOL 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.
BIOL 997. Independent Study. 2 Credits.
BIOL 998. Thesis. 1-9 Credits.
Repeatable to 9 credits.
BIOL 999. Dissertation. 1-15 Credits.
Repeatable to 15 credits.

Undergraduate Courses for Graduate Credit

BIOL 312. Evolution. 3 Credits.
A study of the processes that have led from the origin of life to the diverse patterns and forms of life observable today. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L or an equivalent approved by the department. S.

BIOL 316. Genetics. 3 Credits.
An introduction to genetics, with emphasis on classical genetic analysis and the biochemistry of gene transmission, expression and regulation. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L or an equivalent approved by the department. F.

BIOL 332. General Ecology. 3 Credits.
An introduction to ecology. Covers the relationship of individuals, populations, communities and ecosystems to their biotic and abiotic environments. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L or an equivalent approved by the department. F.

BIOL 332L. Gen Ecology Lab. 1 Credit.
Field projects and laboratory exercises to complement BIOL 332. Counts as an upper-division laboratory course. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L. Prerequisite or Corequisite: BIOL 332. F.

BIOL 333. Population Biology. 3 Credits.
Principles of population genetics, population ecology, and evolution in plants and animals. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L or permission of instructor. F, even years.

BIOL 336. Systematic Botany. 4 Credits.
Morphology, evolution, and classification of vascular plants with emphasis on the flora of the Great Plains. Counts as an upper-division laboratory course. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L or permission of instructor. F, even years.

BIOL 338. Animal Behavior. 2 Credits.
Studies in animal social behavior. The influences of environmental factors on behavior is emphasized. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L or an equivalent approved by the department. S, even years.

BIOL 341. Cell Biology. 3 Credits.
Description of processes common to life at the cellular level including: biochemical and structural organization, membrane function, motility, signal transduction, growth, division and genetic regulation of the cell. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L. Prerequisite or Corequisite: CHEM 122. S.

BIOL 341L. Cell Biol Lab. 1 Credit.
Laboratory investigation utilizing techniques to study life at the cellular level including chemical composition and characterization, enzyme kinetics, metabolism and microscopy. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L. Prerequisite or Corequisite: BIOL 341L. S.

BIOL 350. Plant Ecology. 3 Credits.
Structure and function of plants as they relate to the maintenance of plant populations and communities. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L or permission of instructor. S, even years.

BIOL 363. Entomology. 4 Credits.
Structure, functions, life history, classification, habits and distribution of insects. Counts as an upper-division laboratory course. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L or an equivalent approved by the department. F, even years.

BIOL 364. Parasitology. 2 Credits.
Classification, structure, functions, and life-cycles of parasites having importance to human, wildlife and veterinary health. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L. F, odd years.

BIOL 364L. Parasitology Laboratory. 2 Credits.
A basic parasitology laboratory to complement BIOL 364. Counts as an upper-division laboratory course. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L. Prerequisite or Corequisite: BIOL 364. F, odd years.

BIOL 369. Histology. 2 Credits.
Microscopical anatomy of vertebrate tissues and organs, with emphasis on man and other mammals. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L or an equivalent approved by the department. S.

BIOL 369L. Histology Lab. 2 Credits.
A basic histology laboratory to complement BIOL 369. Counts as an upper-division laboratory course. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L or an equivalent approved by the department. Prerequisite or Corequisite: BIOL 369. S.

BIOL 376. Animal Biology. 3 Credits.
Evolution, morpho-anatomy, development, reproduction and other aspects of the natural history of invertebrate and vertebrate animals. Prerequisites: BIOL 150 and BIOL 151. S.

BIOL 378. Developmental Biology. 3 Credits.
An overview of general stages and mechanisms of development, experimental approaches used to study developmental processes, and genetic and environmental influences that govern development. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, BIOL 151L, BIOL 315 and BIOL 341. F.

BIOL 410. Molecular Biology Techniques. 4 Credits.
Applications of DNA and RNA analysis and recombinant DNA technologies, emphasizing practical experience in the laboratory. This class will meet twice a week for 50 minutes in the classroom, and students will be expected to work approximately 4-6 hours a week in the lab during open lab times. Counts as an upper-division laboratory course. Prerequisite: BIOL 315 is recommended. F, S.

BIOL 415. Genomics. 4 Credits.
Genomics describes the determination of the complete nucleotide sequence of an organism and subsequent analyses to decode the structural and functional information of all genes and regulatory sequences in the genome. This four-credit course will consist of lectures, computer lab sessions, in-class exercises, take-home assignments, student presentations, and discussion of research articles. Counts as an upper-division laboratory course. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 315. S.

BIOL 425. Ichthyology. 3 Credits.
Structure and function, anatomy, physiology, behavior, classification, distribution and ecologic aspects of fishes. Counts as an upper-division laboratory course. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L or an equivalent approved by the department. F, even years.

BIOL 426. Birds & Mammals. 4 Credits.
Birds and Mammals is designed to familiarize students with avian and mammalian biology, including anatomy and physiology, behavior, ecology, evolution and conservation. Lab exercises will be integrated with lecture to emphasize taxonomy and identification. Counts as an upper-division laboratory course. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L. S.

BIOL 430. Human Dimensions of Wildlife and Fisheries. 3 Credits.
This course explores interactions among humans and fisheries and wildlife resources, with a focus on principles important for understanding and addressing wildlife management. Topics will include public attitudes, expectations and diverse values of fisheries and wildlife resources; stakeholder engagement; public relations; governance; philosophy and ethics of resource use and management; and human dimensions research methodology. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L. S.

BIOL 431. Wildlife Management. 4 Credits.
Theory and methods of management of wildlife populations. Counts as an upper-division laboratory course. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L or an equivalent approved by the department. F, odd years.

BIOL 432. Techniques in Wildlife Population Assessment. 4 Credits.
Techniques in Wildlife Population Assessment is a course designed to teach students techniques used to assess wildlife populations for conservation and management. Students learn the appropriate situations to use the techniques, how to properly conduct the procedures, how to collect data from the use of these techniques, and how to report the findings to a variety of audiences. The structure of the course is designed to teach students proper research methodology so that they not only know how and when to use the techniques, but also how they can apply their findings to make appropriate management recommendations for wildlife conservation and management under a variety of settings or conditions. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L. F, even years.
BIOL 433. Aquatic Ecology. 3 Credits.
Analysis of the relationships between organisms and their physical, chemical and biological environments in freshwater ecosystems. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L or an equivalent approved by the department. S. odd years.

BIOL 435. Large Mammal Ecology and Management. 3 Credits.
A course covering details of the population ecology, specialized management approaches and techniques, and conservation of large-bodied mammals in North America and worldwide. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L. Corequisites: BIOL 332 and BIOL 332L. F. odd years.

BIOL 438. Fisheries Management. 3 Credits.
Concepts and approaches to the management of freshwater fisheries. Course will include discussion of life histories and requirements of important regional sport fishes. Counts as an upper-division laboratory course. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L or instructor permission. S. even years.

BIOL 439. Conservation Biology. 3 Credits.
A course that integrates information from the disciplines of ecology, genetics, biogeography, economics, environmental policy, and ethics towards understanding how to maintain and restore biological diversity. F. odd years.

BIOL 442. Physiology of Organs and Systems. 3 Credits.
Study of the physiology of organs and organ systems in vertebrates. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, BIOL 151L, and Junior or Senior standing or an equivalent approved by the department. F.

BIOL 442L. Physiology of Organs and Systems Laboratory. 1 Credit.
A physiology laboratory to complement BIOL 442. Counts as an upper-division laboratory course. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, and BIOL 151L or and equivalent approved by the department. Prerequisite or Corequisite: BIOL 442. F.

BIOL 450. Molecular Genetics. 2 Credits.
Topics will include basic molecular genetic mechanisms, recombiant DNA technology, the organization and function of the cell nucleus, and the molecular control of gene expression. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, BIOL 151L, and BIOL 315 or and equivalent approved by the department. On demand.

BIOL 470. Biometry. 4 Credits.
Analysis of biological data. Covers descriptive statistics, inferential statistics (e.g., t-tests, goodness-of-fit tests, regression, ANOVA and non-parametric tests), and interpreting and presenting statistical results. Prerequisites: BIOL 150, BIOL 150L, BIOL 151, BIOL 151L, and BIOL 315 or and equivalent approved by the department. F.

Doctor of Philosophy in Biology

Admission Requirements
1. Must meet current minimum general requirements as published by the School of Graduate Studies.
2. May enter the program with a Master's degree or directly with a Bachelor's degree.
3. All applicants seeking admission to the biology graduate program must provide GRE General test scores. Strength of scores will be considered regarding admission and awarding of departmental support.
4. Minimum GPA of 3.0 for the Master's degree work. If applying with only an undergraduate degree, must have a minimum GPA of 2.75 for all undergraduate work or 3.0 for junior - senior credits.
5. Satisfy the School of Graduate Studies' English Language Proficiency requirements as published in the graduate catalog.

Financial Assistance
Financial aid in the form of teaching assistantships, research assistantships, fellowships and internships are available on a competitive basis. Students seeking teaching assistantships should complete their applications by February 15, since most offers for appointments are made beginning in early March. Teaching assistantships are renewable if progress toward the degree and instructional service are satisfactory. Research assistantships may be offered by faculty members for work on specific research projects for nine or twelve month periods.

Degree Requirements
Students seeking the Doctor of Philosophy degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Biology Department.

The Ph.D. degree program requires the completion of a program of study of at least 90 semester credits beyond the baccalaureate degree. The program of study, prepared with the approval of a five-member faculty advisory committee, includes the following:

1. A major area of a minimum 90 credits including coursework, research and dissertation structured at the committee's discretion but with a minimum of 18 semester credits of course work. Work completed in a master's program may be incorporated into the doctoral program if approved by the student's advisory committee.
2. A minor is not required, but each student is expected to show competence in related areas as determined by the student's faculty advisory committee.
3. A minimum of five (5) credits on BIOL 503 Seminar (included in 1. above).
4. A minimum of four (4) credits of BIOL 509 Scientific Writing (credits included in 1. above). Two credits should be taken while the student is writing their thesis proposal (see below). Two credits can be waived at the discretion of the student's advisory committee for students with a well-written Master's thesis and at least one first-authored publication in press.
5. BIOL 470 Biometry (3 credits) or other introductory statistics course and either 1) BIOL 571 Research Design and Statistical Analysis (3 credits), 2) a 500-level, data analysis course (3 credits minimum) in a specialty area approved by the student's advisory committee, or 3) prior equivalent graduate course in statistical analysis and experimental design if approved by the student's advisory committee.
6. Two scholarly tools. The nature of the scholarly tools shall be determined based upon their importance to the student's field of research as determined by the student's advisory committee.
7. Satisfactory completion of an acceptable dissertation proposal (written proposal, proposal presentation and proposal defense) evaluated by the student's advisory committee.
8. Satisfactory completion of a comprehensive examination administered by the student's advisory committee.

Master of Science in Biology

Admission Requirements
1. Must meet current minimum general requirements as published by the School of Graduate Studies.
2. Must provide GRE General test scores. Strength of scores will be considered regarding admission and awarding of departmental support.
3. Minimum GPA of at least 2.75 for all undergraduate work or 3.0 for the junior - senior credits.
4. Students must indicate thesis vs. non-thesis option upon application. M.S. (thesis) students may request a change to M.S. (non-thesis) only within the first two semesters (not including summer) of enrollment. Such requests will be evaluated by the Graduate Director and the student's advisory committee.
5. Satisfy the School of Graduate Studies' English Language Proficiency requirements as published in the graduate catalog.

Students admitted to the M.S. program may, after one calendar year, and upon the recommendation of his/her advisory committee, request to by-pass the masters degree and work directly toward the Ph.D. degree. The same GRE and GPA requirements apply for by-pass as for students applying for the doctoral program through normal application procedures, i.e., a GPA no lower than 3.0 for work completed while in the M.S. program. The recommendation of the advisory committee shall be brought to a vote in a faculty meeting. A minimum of one week before such a meeting, the faculty shall be notified that the student's updated file consisting of the materials used for application to the M.S. program, a transcript of all academic work completed at UND, and
any additional materials the student wishes to have considered is available for review.

Students seeking summer or fall admission should complete their applications by February 15. Students seeking spring admission should check the School of Graduate Studies webpage for application deadline information. Master’s degree applicants should specify interest in either the thesis or non-thesis option. Inquiries should be directed to the Director of Graduate Studies, Biology Department.

**Degree Requirements**

Students seeking the Master of Science degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Biology Department. The Master of Science degree program is designed to produce broadly trained biologists for job opportunities or continued graduate study.

**Thesis Option**

The M.S. degree program with thesis requires the completion of a program of study of at least 32 semester credits beyond the baccalaureate degree. The program of study, prepared with the approval of a three-member faculty advisor committee, includes the following:

1. A minimum of 30 credits including coursework, research and thesis with research and thesis accounting for no more than 50% of credits.
2. A minimum of three (3) credits of BIOL 503 Seminar (credits included in 1. above).
3. A minimum of four (4) credits of BIOL 509 Scientific Writing, (credits included in 1. above). Two credits should be taken while the student is writing their thesis proposal (see below).
4. BIOL 470 Biometry (3 credits) or other introductory statistics course and either 1) BIOL 571 Research Design and Statistical Analysis (3 credits), 2) a 500-level, data analysis course (3 credits minimum) in a specialty area approved by the student’s advisory committee, or 3) prior equivalent graduate course in statistical analysis and experimental design if approved by the student’s advisory committee.
5. Satisfactory completion of an acceptable thesis proposal (written proposal, proposal presentation and proposal defense) evaluated by the student’s advisory committee.
6. Satisfactory completion of a comprehensive examination administered by the student’s advisory committee; and
7. Satisfactory completion of an acceptable thesis (written thesis, thesis seminar and thesis defense) evaluated by the student’s advisory committee.

**Non-Thesis Option**

This degree program is designed for students who wish to obtain broad training in graduate biology without research emphasis. The M.S. non-thesis degree program requires the completion of a program of study of at least 32 semester credits beyond the baccalaureate degree. The program of study prepared with the approval of a faculty supervisor, includes the following:

1. At minimum of 32 credits of coursework.
2. A minimum of three (3) credits of BIOL 503 Seminar (credits includes in 1. above).
3. A minimum of 23 credits in the major (credits included in 1. above).
4. BIOL 599 Research and BIOL 998 Thesis will not count toward the 32 credits.
5. Satisfactory completion of a comprehensive examination administered by the student’s advisor and two other faculty members selected by the student with the concurrence of the advisor, the faculty members involved and the department chairperson.
6. Satisfactory completion of an acceptable Independent Study. The Independent Study should be substantial and rigorous and involve a written report and a formal oral presentation to the Department.

**Biomedical Sciences**

M.S. in Biomedical Sciences (p. 347)

**ANAT Courses**

ANAT 501. Biomedical Information Retrieval. 1 Credit.
This course integrates electron information retrieval techniques with biomedical research education to develop the student’s ability to augment traditional learning and research. Electronic techniques covered include data base searching and internet resources. S/U grading. F.S, SS.

ANAT 505. Seminar in Anatomy and Cell Biology. 1 Credit.
This course provides students an opportunity to organize and orally present scientific information to an audience in a forum conducive to the development of their skills in effective communication. Seminars delivered by students, UND faculty, and other invited speakers present current advancements in biomedical research that promote student learning of principles of biomedical sciences. Repeatable to 5 credits.

ANAT 513. Gross Anatomy. 6 Credits.
Gross Anatomy will be an intensive one semester course that will use a regional approach to enhance the understanding of the structural and functional relationships as well as organization of the adult human body. Lectures will be reinforced with complete cadaver dissection and multiple clinical imaging modalities to strengthen problem solving and critical thinking skills. Prerequisites: ANAT 204L and permission of the instructor. S.

ANAT 521. Principles of Developmental Biology. 3 Credits.
This is a student driven course designed to provide the student with a firm understanding of the concepts in developmental biology. Students will be using a wide range of materials from textbooks to the internet to gain a graduate level understanding including how to apply this knowledge to research applications. Student presentations will address advanced principles of developmental mechanisms and underlying human embryology. S.

ANAT 590. Readings in Anatomy and Cell Biology. 1-3 Credits.
Students may elect to do a readings.

ANAT 591. Special Topics in Anatomy and Cell Biology. 1-3 Credits.
A series of lectures, discussions and/or laboratory experiences developed around a specific topic in the anatomical or cell biological sciences. Prerequisite: Permission of instructor. Repeatable to 3 credits.

ANAT 593. Research in Anatomy and Cell Biology. 1-15 Credits.
Research is offered in the specialty fields of the faculty of the department, and involves a variety of problems and research tools in morphology and cell biology. Repeatable.

ANAT 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

ANAT 997. Independent Study. 2 Credits.
Repeatable to 9 credits.

ANAT 999. Dissertation. 1-15 Credits.
Repeatable to 15 credits.

**BIMD Courses**

BIMD 501. Scientific Discovery I. 6 Credits.
A problem based course in which students will address a set of biomedical research scenarios that have been designed so that students will acquire skills in critical thinking, finding, interpreting, and analyzing scientific literature, developing hypothesis-driven questions, proposing and designing experiments, and communicating scientific outcomes orally and in written format. F.

BIMD 502. Scientific Discovery II. 6 Credits.
A problem based course in which students will address a set of biomedical research scenarios that have been designed so that students will advance their skills in critical thinking, finding, interpreting, and analyzing scientific literature, developing hypothesis-driven questions, proposing and designing experiments, and communicating scientific outcomes orally and in written format. This course is a continuation and advancement of BIMD 501. Prerequisite: BIMD 501. S.

BIMD 510. Basic Biomedical Statistics. 2 Credits.
A series of lectures, demonstrations and exercises to provide students with the basic rationales for the use of statistics in the assessment of biomedical data and a selected set of the most common and useful statistical tests. Prerequisite: BIMD 500 or permission of course director. S.
BIMD 513. Seminars in Biomedical Science. 1 Credit.
A series of presentations on original research conducted by UND faculty members as well as extramural leaders in academic and industrial research in the biomedical sciences. Students will participate through assigned reading and writing exercises related to the presentations.

BIMD 514. Foundations of Bioinformatics. 3 Credits.
In this course, students will learn fundamental concepts and methods in bioinformatics, a field at the intersection of biology and computing. The course surveys a wide range of topics including bioinformatics web resources, computational sequence analysis, sequence homology searching and motif finding, transcriptome analysis, and network/pathway analysis. Students will also have opportunities to learn about available bioinformatics web-resources (e.g. UCSC Genome Browser, STRING/BioGRID interaction databases, and etc), next-generation sequencing analysis (focusing on RNA-Seq data) as well as relevant data-analysis tools (R and BioConductor, Ingenuity Pathway Analysis, DAVID, etc). The course will also familiarize students with the Linux environment and computational tools needed to manipulate and analyze large biological sequencing data sets. Students will need a familiarity with basic biomedical concepts and basic knowledge of computer usage. No programming skills are required. Students should bring their own wifi-enabled laptop to lectures to fully benefit from the hands-on components of each lecture. Prerequisite: Open to graduate and senior undergraduate students with permission of the instructor. F.

BIMD 516. Responsible Conduct of Research. 2 Credits.
A series of lectures and discussion sessions covering topics related to responsible conduct in research. Students will examine a variety of issues including introduction to ethical decision making, the experience of conflict, laboratory practices, data management, reporting of research, conflict of interest, and compliance. Examples and case studies will be drawn primarily from the biomedical sciences. F.

BIMD 517. Principles of Histology. 3 Credits.
Principles of Histology is a laboratory and discussion based course that builds on prior experience in cell biology and involves a strong self-study component through the use of virtual slides as well as lecture and laboratory orientation videos. By the end of the course the student will have demonstrated a significant knowledge base of tissue microanatomy sufficient for understanding and applying the principles to a wide range of research projects. The student will also have gained sufficient knowledge of histology to be capable of teaching this material to medical, professional, graduate, and undergraduate students. Prerequisite: PATH 500 or permission of instructor. S.

BIMD 518. Grant Writing. 2 Credits.
This is an advanced graduate grant writing and oral presentation course. The objectives of this course are to challenge students: (1) to critically evaluate their own research in an effort to clearly define the significance and innovation of their project, (2) to begin to develop novel ideas based on their research efforts that have the potential to significantly impact their field of study, and (3) to prepare students to present these ideas orally and in writing in a manner that is both logical and convincing. Prerequisites: BIMD 501 and BIMD 502, or consent of instructor. F.

BIMD 520. Principles of Neuroanatomy. 2 Credits.
In this course students will learn the fundamental principles of neuroscience, particularly gross and cellular anatomy, development and systems physiology of the nervous system. Behavioral, cognitive and clinical manifestations of abnormal neural functions will also be addressed. Prerequisite: BIMD 502 or permission of instructor. F.

BIMD 521. Neurophysiology. 2 Credits.
This course is designed to introduce students to the electrical properties of neuronal membranes. The course is organized to first provide a brief review of the basic properties of semi-permeable membranes. The electrical and biochemistry principles that apply to neuronal membranes are discussed. Prerequisite: BIMD 502 or consent of instructor. F.

BIMD 522. Principles of Neuropsychopharmacology. 2 Credits.
This course is designed to introduce students to the latest developments in molecular neuropsychopharmacology. The course directive is to provide an up-to-date foundation for clinical neuroscience by emphasizing a comprehensive molecular and cellular approach to the effects of drugs on the nervous system. Prerequisite: BIMD 502 or consent of instructor. S.

BIMD 523. Neurochemical Basis of the Nervous System. 2 Credits.
This course is designed to introduce students to fundamental concepts of brain metabolism and neurochemical signaling. It emphasizes recent advances in understanding brain biochemical processes and molecular mechanisms occurring in health and disease. Prerequisite: BIMD 502 or consent of instructor. S.

BIMD 524. Neurodegenerative Diseases and Pathophysiology. 2 Credits.
This course exposes students to diverse neurodegenerative diseases and nervous system pathophysiology. The emphasis is on mechanistic understanding of the most recent advances in the field. Prerequisite: BIMD 502 or consent of instructor. S.

BIMD 525. Readings in Neuroscience. 1-4 Credits.
A supervised readings course on topics of mutual interest to the student and a faculty member. Prerequisite: BIMD 502 or consent of instructor. Repeatable to 4 credits. On demand.

BIMD 526. Medical Experiences for Graduate Students. 1 Credit.
The goal of this course is to introduce the graduate student to a “disease-specific” clinical experience so that the student can acquire a better understanding of the importance of translational medicine, develop a firm appreciation of a patient’s and a physician’s understanding of disease and its treatment, and to introduce the student to the overall culture of clinical research. Prerequisites: Successful completion of comprehensive exam and permission of academic advisor and Instructor of Record; student should initiate discussion with the Instructor of Record at least one month prior to the start of enrollment. S/U grading. On demand.

BIMD 527. Advanced Studies in Biological Safety. 3 Credits.
This course is designed to provide fundamental concepts and methods in biological safety to typical biomedical, public health, and biology graduate students who do not have advanced training in microbiology, epidemiology, and environmental health sciences. Additionally, this course will fulfill some of the registration requirements for Registered Biosafety Professional (RBP) and Certified Biosafety Professional (CBSP) credential for individuals looking for careers in the field of biological safety. This course is open to graduate students and to senior undergraduate students with permission of the instructor. Prerequisite: Permission of the instructor.

BIMD 530. Components of the Immune System. 2 Credits.
Have you ever wondered why you don't get sick every time you breathe air which can carry as many as 2000 different kinds of microbes on any given day? Or what keeps your defense system from attacking your own cells but can get rid of most invaders without you even noticing? This is the amazing task of your fascinating immune system! This course will provide an overview of cellular and molecular components of mammalian immune system and their function. The students will learn how these components are derived and how they interact and communicate with each other to coordinate a response to pathological insults in order to protect the human body. Prerequisite: BIMD 502 or consent of instructor. F.

BIMD 531. Components of Microbial Pathogenesis. 2 Credits.
The objective of the course is to provide students with a background in the mechanisms of microbial pathogenesis. Students will learn basic principles of host-parasite interactions. Paradigms of host-parasite interactions will be illustrated by studying, at the molecular and cellular levels, specific infectious diseases and the agents that cause them. Prerequisite: BIMD 502 or consent of instructor. F.

BIMD 532. Microbial Gene Regulation. 1 Credit.
This course will provide an understanding of genetic regulation in bacteria. Classic pathways will be examined as paradigms of regulatory circuits. These examples will be expanded to learn how bacteria exploit host cells as well as the use of bacterial regulatory circuits in modern molecular biology. S.

BIMD 533. Microbial Membranes and Transport. 1 Credit.
This course will explore bacterial membranes with particular emphasis on generation of energy and transport of molecules across the membranes. Prerequisite: BIMD 502 or consent of instructor. S.

BIMD 534. Microbial Cell Structure and Function. 1 Credit.
Microbial cells have unique structures that relate their functions. Students completing this course will have an understanding of how prokaryotic and eukaryotic organisms differ and how different structures can be used to obtain similar functions. They will understand how microbial structures influence interactions between microbes and between microbes and eukaryotic organisms. Prerequisite: BIMD 502 or consent of instructor. S.
BMB 535. Bacterial Host: Pathogen Interactions. 1 Credit.
The objective of the course is to provide students with a background in the fundamental aspects that occur at the bacterial-host interface. Students will learn the interplay between bacterial virulence factors, strategies used to evade host defenses, and host responses to infection. Prerequisite: BIMD 502 or consent of instructor. S.

BMB 536. Molecular Biology and Pathogenesis of Viruses. 1 Credit.
This course will cover the structure, replication, and pathogenesis of human RNA and DNA viruses, the host immune response to viral infection and the strategies employed by viruses to escape immune detection and elimination. Prerequisite: BIMD 502 or consent of instructor. S.

BMB 537. Host-Pathogen Interactions Involving Eukaryotic Microbes (Parasites/Fungi). 1 Credit.
Eukaryotic microbe infections have a devastating impact on global health and economic development as they infect over one third of the world's population and cause acute and chronic pathologies. Furthermore, macroscopic parasites (helminths/worms) are master regulators of host inflammatory response and hence reduce the immune response to coinfections and negatively affect the success of vaccination programs against many other pathogens. In contrast, it has been proposed that the rise in autoimmune diseases in the developed world could be a direct result of the successful complete elimination of parasitic helminths in these communities. Thus, the purpose of this course is to provide a basic knowledge of the clinically important eukaryotic microbe pathogens and the immune response associated with their infections. A series of lectures will cover course components; a) basic introduction to protozoa, helminth, and fungi, and b) basic knowledge of the immune response and its involvement in parasitic/fungal infections. An effort has been made to increase clinical relevance and problem-solving skills through a team-learning exercise involving quiz and paper presentations. S.

BMB 538. Immunological Disorders. 1 Credit.
This course will discuss introduction to cellular and molecular immunopathologies leading to autoimmune diseases, and primary and secondary immunodeficiencies; and the role of the immune system in tumorigenesis and transplantation, as well as various methods of modification of the immune response. Prerequisite: BIMD 502 or consent of instructor. S.

BMB 539. Readings in Microbiology and Immunology. 1-4 Credits.
A supervised readings course on topics of mutual interest to the student and a faculty member. Prerequisite: BIMD 502 or consent of instructor. Repeatable to 4 credits. On demand.

BMB 590. Research. 1-12 Credits.
The course allows research in pertinent problems in various aspects of biomedical sciences. Repeatable. F,S,SS.

BMB 591. Advanced Topics in Biomedical Sciences. 1-3 Credits.
A series of lectures, discussions and/or laboratory experiences developed around a specific topic in the biomedical sciences. Repeatable as topics vary. Prerequisite: BIMD 502 or consent of instructor. Repeatable to 3 credits.

BMB 998. Thesis. 1-9 Credits.
Completion of dissertation required for Ph.D. Repeatable to 9 credits. F,S,SS.

BMB 999. Dissertation. 1-15 Credits.
Repeatable to 15 credits.

MBIO Courses

MBIO 507. Seminar in Microbiology. 1 Credit.
S/U grading. F.

MBIO 511. Microbiology and Immunology Literature. 1 Credit.
A series of reports on current scientific literature in Microbiology and Immunology. S/U grading. S.

MBIO 513. Research Tools. 2 Credits.
Orientation to research and laboratory safety. The theory and application of modern laboratory techniques include tissue culture, cell fractionation, enzyme assay, immunization procedures, bacterial growth curves, photomicrography, strain construction, genetic engineering, gel electrophoresis, enzyme immunoassay, and western blot techniques are presented. S/U grading. F.

MBIO 515. Advanced Topics. 2 Credits.
A series of topics in microbiology and immunology presented on an episodic basis. The topics may vary, but are expected to include: (A) Immunology, (B) Infectious Diseases, and (C) Molecular Biology. Prerequisite: Previous basic course in the area to be covered.

MBIO 590. Research in Microbiology. 2-6 Credits.
Advanced problems in microbiology and related fields. Hours arranged. Repeatable.

MBIO 591. Special Problems in Microbiology. 1-6 Credits.
Short-term research projects.

MBIO 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

MBIO 997. Independent Study. 2 Credits.

MBIO 998. Thesis. 1-8 Credits.
Repeatable to 8 credits.

MBIO 999. Dissertation. 1-15 Credits.
Repeatable to 15 credits.
PPT Courses

PPT 500. Principles of Physiology and Pharmacology. 6 Credits.
Graduate level survey course covering basic principles of human physiology and pharmacology. Material covered will include the physiology (how the body works) and the pharmacology (how drugs affect physiological functions) of the major organ systems. Covered also will be basic pharmacological principles including pharmacodynamics, pharmacokinetics and therapeutics. Teaching modalities used are designed to actively engage students in critical thinking and knowledge application. Prerequisite: BIMD 500 or consent of instructor.

PPT 503. Advanced Pharmacology or Physiology. 3 Credits.
Prerequisite: PPT 500 or consent of instructor.

PPT 505. Research Techniques. 1-3 Credits.
Prerequisite: Consent of instructor.

PPT 511. Biochemical and Molecular Mechanisms of Pharmacology. 3 Credits.
Fundamental concepts of pharmacology with emphasis on biochemical and molecular mechanisms. Prerequisites: BIMD 500 and PPT 500, or consent of instructor.

PPT 521. Seminar in Pharmacology, Physiology and Therapeutics. 1 Credit.
An in-depth coverage of a particular topic chosen by the instructor. Prerequisite: Consent of instructor.

PPT 522. Seminar in Pharmacology, Physiology and Therapeutics. 1 Credit.
S/U grading.

PPT 525. Advanced Renal Physiology. 3 Credits.
Prerequisite: PPT 500 or consent of instructor.

PPT 526. Advanced Respiratory Physiology. 3 Credits.
Prerequisite: PPT 500 or consent of instructor.

PPT 528. Advanced Endocrinology. 3 Credits.
Prerequisite: PPT 500 or consent of instructor.

PPT 529. Adv Cardiovascular Physiology. 3 Credits.
Prerequisite: PPT 500 or consent of instructor.

PPT 530. Advanced Neurochemistry. 3 Credits.
This course is designed to introduce graduate students to the discipline of neurochemistry. This course builds on concepts introduced in PPT 500, with an emphasis on brain biochemical processes occurring in health and disease. Prerequisite: PPT 500 or consent of instructor.

PPT 580. Readings in PPT. 1-4 Credits.
Prerequisite: Consent of instructor. Repeatable to 8 credits.

PPT 591. Research in PPT. 1-15 Credits.
Repeatable.

PPT 996. Continuing Enrollment. 1-12 Credits.
Prerequisite: Consent of instructor. Repeatable. S/U grading.

PPT 998. Thesis. 1-9 Credits.
Prerequisite: Consent of instructor. Repeatable to 9 credits.

PPT 999. Dissertation. 1-12 Credits.
Prerequisite: Consent of instructor. Repeatable.

Doctor of Philosophy in Biomedical Sciences

Admission Requirements

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. Completion of a four-year Bachelor’s degree or equivalent from a recognized college or university as described in the UND Undergraduate and Graduate Academic Catalog. Exceptions must be approved by the Dean of the School of Graduate Studies.

2. Coursework: Admission into the Biomedical Sciences Graduate Program is dependent upon the applicant’s demonstration of effective academic skills and appropriate undergraduate training. Ideally, the applicant will have completed the following coursework:
   - General Biology with laboratory
   - General Chemistry with laboratory
   - Organic Chemistry with laboratory
   - Physics with laboratory
   - Biochemistry or equivalent
   - Calculus

3. Applicants must have a cumulative undergraduate GPA of at least 3.0/4.0. Applicants with previous graduate education should have a cumulative GPA of 3.5/4.0 in their graduate level course work.

4. Graduate Record Examination scores: Applicants must submit Graduate Record Examination scores. The General test is required; the Subject test is strongly recommended. The Biochemistry, Cell and Molecular Biology, Biology, or Chemistry subject tests are acceptable. Preference for admission will be given to applicants whose averaged test scores are at or above the 50th percentile.

5. International applicants must satisfy the School of Graduate Studies English Language Proficiency Requirements.

6. A Statement of Goals must be included with the application materials. This statement will describe the student’s academic achievements, research experience and accomplishments, career goals, and objectives for applying to the Biomedical Sciences Graduate Program.

7. Three letters of recommendation addressing the student’s academic performance and research or professional experience are required to complete the application. At least two letters must be from faculty having direct knowledge of the student’s academic capabilities.

8. Preference will be given to students who can demonstrate undergraduate research and/or a record of scholarly publication or other relevant experience.

Degree Requirements

Students seeking the Ph.D. degree in the Biomedical Sciences Graduate Program must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Biomedical Sciences Graduate Program. In addition to course work, the Ph.D. degree requires completion of an acceptable dissertation in a program of study designed by the student with Faculty Advisory Committee approval.

1. A minimum of 90 credit hours of graduate level courses including research and dissertation.

2. Completion of the following graduate level courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIMD 501</td>
<td>Scientific Discovery I</td>
<td>6</td>
</tr>
<tr>
<td>BIMD 502</td>
<td>Scientific Discovery II</td>
<td>6</td>
</tr>
<tr>
<td>BIMD 510</td>
<td>Basic Biomedical Statistics (fulfills the scholarly tool requirement)</td>
<td>2</td>
</tr>
<tr>
<td>BIMD 516</td>
<td>Responsible Conduct of Research</td>
<td>2</td>
</tr>
<tr>
<td>BIMD 518</td>
<td>Grant Writing</td>
<td>2</td>
</tr>
<tr>
<td>BIMD 590</td>
<td>Research</td>
<td>at least 50</td>
</tr>
<tr>
<td>BIMD 999</td>
<td>Dissertation</td>
<td>6</td>
</tr>
</tbody>
</table>

3. The optional transcriptable subplan (Specialization) in Neuroscience requires completion of the following 5 courses (10 credits):

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIMD 520</td>
<td>Principles of Neuroanatomy</td>
<td>2</td>
</tr>
<tr>
<td>BIMD 521</td>
<td>Neurophysiology</td>
<td>2</td>
</tr>
<tr>
<td>BIMD 522</td>
<td>Principles of Neopharmacology</td>
<td>2</td>
</tr>
<tr>
<td>BIMD 523</td>
<td>Neurochemical Basis of the Nervous System</td>
<td>2</td>
</tr>
<tr>
<td>BIMD 524</td>
<td>Neurodegenerative Diseases and Pathophysiology</td>
<td>2</td>
</tr>
</tbody>
</table>
4. The optional transcriptable subplan (Specialization) in Microbiology and Immunology requires completion of the following 2 courses (4 credits):

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIMD 530</td>
<td>Components of the Immune System</td>
<td>2</td>
</tr>
<tr>
<td>BIMD 531</td>
<td>Components of Microbial Pathogenesis</td>
<td>2</td>
</tr>
</tbody>
</table>

and also requires completion of 5 credits chosen from the following courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIMD 532</td>
<td>Microbial Gene Regulation</td>
<td>1</td>
</tr>
<tr>
<td>BIMD 533</td>
<td>Microbial Membranes and Transport</td>
<td>1</td>
</tr>
<tr>
<td>BIMD 534</td>
<td>Microbial Cell Structure and Function</td>
<td>1</td>
</tr>
<tr>
<td>BIMD 535</td>
<td>Bacterial Host: Pathogen Interactions</td>
<td>1</td>
</tr>
<tr>
<td>BIMD 536</td>
<td>Molecular Biology and Pathogenesis of Viruses</td>
<td>1</td>
</tr>
<tr>
<td>BIMD 537</td>
<td>Host-Pathogen Interactions involving Eukaryotic</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Microbes (Parasites/Fungi)</td>
<td></td>
</tr>
<tr>
<td>BIMD 538</td>
<td>Immunological Disorders</td>
<td>1</td>
</tr>
</tbody>
</table>

5. Students who choose not to complete a subplan must complete a minimum of 6 credit hours of graduate level elective courses selected from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANAT 513</td>
<td>Gross Anatomy</td>
<td>6</td>
</tr>
<tr>
<td>ANAT 517</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>ANAT 521</td>
<td>Principles of Developmental Biology</td>
<td>3</td>
</tr>
<tr>
<td>ANAT 522</td>
<td>Neuroscience</td>
<td>6</td>
</tr>
<tr>
<td>ANAT 591</td>
<td>Special Topics in Anatomy and Cell Biology</td>
<td>1-3</td>
</tr>
<tr>
<td>BMB 533</td>
<td>Advanced Topics</td>
<td>1-9</td>
</tr>
<tr>
<td>MBIO 501</td>
<td>Molecular Virology</td>
<td>2</td>
</tr>
<tr>
<td>MBIO 504</td>
<td>Microbial Physiology</td>
<td>2</td>
</tr>
<tr>
<td>MBIO 508</td>
<td>Microbial Pathogenesis</td>
<td>2</td>
</tr>
<tr>
<td>MBIO 509</td>
<td>Immunology</td>
<td>3</td>
</tr>
<tr>
<td>MBIO 512</td>
<td>Microbial Genetics</td>
<td>2</td>
</tr>
<tr>
<td>MBIO 515</td>
<td>Advanced Topics</td>
<td>2</td>
</tr>
<tr>
<td>MBIO 519</td>
<td>Advanced Immunology</td>
<td>2</td>
</tr>
<tr>
<td>PPT 500</td>
<td>Principles of Physiology and Pharmacology</td>
<td>6</td>
</tr>
<tr>
<td>PPT 503</td>
<td>Advanced Pharmacology or Physiology</td>
<td>3</td>
</tr>
<tr>
<td>PPT 505</td>
<td>Research Techniques</td>
<td>1</td>
</tr>
<tr>
<td>PPT 511</td>
<td>Biochemical and Molecular Mechanisms of</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Pharmacology</td>
<td></td>
</tr>
<tr>
<td>PPT 512</td>
<td>Special Topics in Pharmacology, Physiology and</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Therapeutics</td>
<td></td>
</tr>
<tr>
<td>PPT 525</td>
<td>Advanced Renal Physiology</td>
<td>3</td>
</tr>
<tr>
<td>PPT 526</td>
<td>Advanced Respiratory Physiology</td>
<td>3</td>
</tr>
<tr>
<td>PPT 527</td>
<td>Advanced Neurophysiology</td>
<td>3</td>
</tr>
<tr>
<td>PPT 528</td>
<td>Advanced Endocrinology</td>
<td>3</td>
</tr>
<tr>
<td>PPT 529</td>
<td>Adv Cardiovascular Physiology</td>
<td>3</td>
</tr>
<tr>
<td>PPT 530</td>
<td>Advanced Neurochemistry</td>
<td>3</td>
</tr>
<tr>
<td>PPT 535</td>
<td>Mechanisms of Neurodegenerative Disorders</td>
<td>3</td>
</tr>
<tr>
<td>PPT 540</td>
<td>Molecular Neuropharmacology</td>
<td>3</td>
</tr>
<tr>
<td>BIMD 520</td>
<td>Principles of Neuroanatomy</td>
<td>2</td>
</tr>
<tr>
<td>BIMD 521</td>
<td>Neurophysiology</td>
<td>2</td>
</tr>
<tr>
<td>BIMD 522</td>
<td>Principles of Neuropharmacology</td>
<td>2</td>
</tr>
<tr>
<td>BIMD 523</td>
<td>Neurochemical Basis of the Nervous System</td>
<td>2</td>
</tr>
<tr>
<td>BIMD 524</td>
<td>Neurodegenerative Diseases and Pathophysiology</td>
<td>2</td>
</tr>
<tr>
<td>BIMD 530</td>
<td>Components of the Immune System</td>
<td>2</td>
</tr>
<tr>
<td>BIMD 531</td>
<td>Components of Microbial Pathogenesis</td>
<td>2</td>
</tr>
<tr>
<td>BIMD 532</td>
<td>Microbial Gene Regulation</td>
<td>1</td>
</tr>
<tr>
<td>BIMD 533</td>
<td>Microbial Membranes and Transport</td>
<td>1</td>
</tr>
<tr>
<td>BIMD 534</td>
<td>Microbial Cell Structure and Function</td>
<td>1</td>
</tr>
<tr>
<td>BIMD 535</td>
<td>Bacterial Host: Pathogen Interactions</td>
<td>1</td>
</tr>
<tr>
<td>BIMD 536</td>
<td>Molecular Biology and Pathogenesis of Viruses</td>
<td>1</td>
</tr>
<tr>
<td>BIMD 537</td>
<td>Host-Pathogen Interactions involving Eukaryotic</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Microbes (Parasites/Fungi)</td>
<td></td>
</tr>
<tr>
<td>BIMD 538</td>
<td>Immunological Disorders</td>
<td>1</td>
</tr>
</tbody>
</table>

6. A student must obtain at least a “B” in all required courses in order to remain in good standing in the graduate program. If less than a “B” is received, the student will be given the opportunity to remediate in a manner determined by the course director. If remediation is unsuccessful, the student may petition the Graduate Faculty to take the course a second time. In the event that the student is unable to raise the grade to at least a “B”, the student must petition the Graduate Faculty to be allowed to remain in the program.

7. Students must maintain a minimum 3.0 GPA in accordance with School of Graduate Studies guidelines (UND Graduate and Undergraduate Academic Catalog).

8. Students must successfully complete the comprehensive examination.

9. Students must fulfill the teaching requirement as defined by the student’s Faculty Advisory Committee in consultation with the Department Chair and the Director of Graduate Studies in Biomedical Sciences.

10. Research and Dissertation: The Ph.D. degree requires completion of a dissertation based on the results of a project completed by the graduate student under the guidance of a faculty advisor. The project must represent an original and independent investigation by the student. It is expected that the student will publish at least one first author peer-reviewed manuscript in a scientific or academic journal prior to the defense of their dissertation. The dissertation prepared by the candidate must be presented orally in a public forum and defended before the Faculty Advisory Committee and the Departmental Graduate Faculty and will be open to all members of the academic community.

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**Master of Science in Biomedical Sciences**

**Admission Requirements**

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. Completion of a four-year Bachelor’s degree or equivalent from a recognized college or university as described in the UND Undergraduate Catalog.

2. Coursework: Admission into the Biomedical Sciences Graduate Program is dependent upon the applicant’s demonstration of effective academic skills and appropriate undergraduate training. Ideally, the applicant will have completed the following coursework:

   - General Biology with laboratory
   - General Chemistry with laboratory
   - Organic Chemistry with laboratory
   - Physics with laboratory
   - Biochemistry or equivalent
   - Calculus
   - Advanced undergraduate coursework in at least one of the following areas: molecular biology, cell/developmental biology, genetics, neuroscience, biochemistry, microbiology, immunology, anatomy, or physiology.

3. Applicants must have a cumulative undergraduate GPA of at least 3.0/4.0. Applicants with previous graduate education should have a cumulative GPA of 3.5/4.0 in their graduate level course work. Graduate Record Examination scores: Applicants must submit Graduate Record Examination scores. The General test is required; the Subject test is strongly recommended. The Biochemistry, Cell and Molecular Biology, Biology, or Chemistry subject tests are acceptable. Preference for admission will be given to applicants whose averaged test scores are at or above the 50th percentile.

4. International applicants must satisfy the School of Graduate Studies English Language Proficiency Requirements.

5. A Statement of Goals must be included with the application materials. This statement will describe the student’s academic achievements, research
experience and accomplishments, career goals, and objectives for applying to the Biomedical Sciences Graduate Program.

6. Three letters of recommendation addressing the student’s academic performance and research or professional experience are required to complete the application. At least two letters must be from faculty having direct knowledge of the student’s academic capabilities.

7. Preference will be given to students who can demonstrate undergraduate research and/or a record of scholarly publication or other relevant experience.

Degree Requirements

Students seeking the Master of Science degree in the Biomedical Sciences Graduate Program must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Biomedical Sciences Graduate Program. In addition to course work, the M.S. degree requires completion of an acceptable thesis in a program of study designed by the student with Faculty Advisory Committee approval.

1. A minimum of 30 credit hours of graduate level courses including research and thesis.

2. Completion of the following core graduate courses:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIMD 501</td>
<td>Scientific Discovery I</td>
<td>6</td>
</tr>
<tr>
<td>BIMD 510</td>
<td>Basic Biomedical Statistics (fulfills the scholarly tool requirement)</td>
<td>2</td>
</tr>
<tr>
<td>BIMD 516</td>
<td>Responsible Conduct of Research</td>
<td>2</td>
</tr>
<tr>
<td>BIMD 590</td>
<td>Research</td>
<td>at least 8</td>
</tr>
<tr>
<td>BIMD 998</td>
<td>Thesis</td>
<td>4</td>
</tr>
</tbody>
</table>

3. Completion of a minimum of 4 credit hours of graduate level elective courses selected from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
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<td>ANAT 513</td>
<td>Gross Anatomy</td>
<td>6</td>
</tr>
<tr>
<td>ANAT 517</td>
<td>Principles of Developmental Biology</td>
<td>3</td>
</tr>
<tr>
<td>ANAT 521</td>
<td>Neuroscience</td>
<td>6</td>
</tr>
<tr>
<td>ANAT 591</td>
<td>Special Topics in Anatomy and Cell Biology</td>
<td>1-3</td>
</tr>
<tr>
<td>BMB 533</td>
<td>Advanced Topics</td>
<td>1</td>
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<td>MBIO 501</td>
<td>Molecular Virology</td>
<td>2</td>
</tr>
<tr>
<td>MBIO 504</td>
<td>Microbial Physiology</td>
<td>2</td>
</tr>
<tr>
<td>MBIO 508</td>
<td>Microbial Pathogenesis</td>
<td>2</td>
</tr>
<tr>
<td>MBIO 509</td>
<td>Immunology</td>
<td>3</td>
</tr>
<tr>
<td>MBIO 512</td>
<td>Microbial Genetics</td>
<td>2</td>
</tr>
<tr>
<td>MBIO 515</td>
<td>Advanced Topics</td>
<td>2</td>
</tr>
<tr>
<td>MBIO 519</td>
<td>Advanced Immunology</td>
<td>2</td>
</tr>
<tr>
<td>PPT 500</td>
<td>Principles of Physiology and Pharmacology</td>
<td>6</td>
</tr>
<tr>
<td>PPT 503</td>
<td>Advanced Pharmacology or Physiology</td>
<td>3</td>
</tr>
<tr>
<td>PPT 505</td>
<td>Research Techniques</td>
<td>1-3</td>
</tr>
<tr>
<td>PPT 511</td>
<td>Biochemical and Molecular Mechanisms of Pharmacology</td>
<td>3</td>
</tr>
<tr>
<td>PPT 512</td>
<td>Special Topics in Pharmacology, Physiology and Therapeutics</td>
<td>2</td>
</tr>
<tr>
<td>PPT 525</td>
<td>Advanced Renal Physiology</td>
<td>3</td>
</tr>
<tr>
<td>PPT 526</td>
<td>Advanced Respiratory Physiology</td>
<td>3</td>
</tr>
<tr>
<td>PPT 527</td>
<td>Advanced Neurophysiology</td>
<td>3</td>
</tr>
<tr>
<td>PPT 528</td>
<td>Advanced Endocrinology</td>
<td>3</td>
</tr>
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<td>PPT 529</td>
<td>Adv Cardiovascular Physiology</td>
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<td>PPT 535</td>
<td>Mechanisms of Neurodegenerative Disorders</td>
<td>3</td>
</tr>
<tr>
<td>PPT 540</td>
<td>Molecular Neuropharmacology</td>
<td>3</td>
</tr>
<tr>
<td>BIMD 520</td>
<td>Principles of Neuroanatomy</td>
<td>2</td>
</tr>
<tr>
<td>BIMD 521</td>
<td>Neurophysiology</td>
<td>2</td>
</tr>
<tr>
<td>BIMD 522</td>
<td>Principles of Neuropharmacology</td>
<td>2</td>
</tr>
<tr>
<td>BIMD 523</td>
<td>Neurochemical Basis of the Nervous System</td>
<td>2</td>
</tr>
<tr>
<td>BIMD 524</td>
<td>Neurodegenerative Diseases and Pathophysiology</td>
<td>2</td>
</tr>
<tr>
<td>BIMD 530</td>
<td>Components of the Immune System</td>
<td>2</td>
</tr>
<tr>
<td>BIMD 531</td>
<td>Components of Microbial Pathogenesis</td>
<td>2</td>
</tr>
<tr>
<td>BIMD 532</td>
<td>Microbial Gene Regulation</td>
<td>1</td>
</tr>
<tr>
<td>BIMD 533</td>
<td>Microbial Membranes and Transport</td>
<td>1</td>
</tr>
<tr>
<td>BIMD 534</td>
<td>Microbial Cell Structure and Function</td>
<td>1</td>
</tr>
<tr>
<td>BIMD 535</td>
<td>Bacterial Host: Pathogen Interactions</td>
<td>1</td>
</tr>
<tr>
<td>BIMD 536</td>
<td>Molecular Biology and Pathogenesis of Viruses</td>
<td>1</td>
</tr>
<tr>
<td>BIMD 537</td>
<td>Host-Pathogen Interactions involving Eukaryotic Microbes (Parasites/Fungi)</td>
<td>1</td>
</tr>
<tr>
<td>BIMD 538</td>
<td>Immunological Disorders</td>
<td>1</td>
</tr>
</tbody>
</table>

4. A student must obtain at least a “B” in all required courses in order to remain in good standing in the graduate program. If less than a “B” is received, the student will be given the opportunity to remediate in a manner determined by the course director. If remediation is unsuccessful, the student may petition the Graduate Faculty to take the course a second time. In the event that the student is unable to raise the grade to at least a “B”, the student must petition the Graduate Faculty to be allowed to remain in the program.

5. Students must maintain a minimum 3.0 GPA in accordance with School of Graduate Studies guidelines (UND Graduate and Undergraduate Academic Catalog).

6. In addition to course work, the Master of Science degree requires completion of a thesis-based scholarly project completed by the graduate student under the guidance of a faculty advisor. It is expected that the results of the scholarly work will be publishable in a peer-reviewed journal.

Business Administration

M.B.A. (p. 354)

M.B.A./J.D. (p. 355)


ACCT Courses

ACCT 501. Seminar in Accounting Issues. 3 Credits.
Addresses current issues in accounting and develops appropriate professional judgment through researching and applying accounting standards. Prerequisite: Permission of MAcc director. F.S.

ACCT 502. Financial Reporting and Decision Making. 3 Credits.
This course provides an overview of financial accounting terminology and concepts, financial statements, and the financial reporting process. Emphasis is placed on the decision usefulness of financial statement information and the financial reporting process as a means of communicating information about firms. Prerequisite: Successful completion of Ivey’s "Business Math and Statistics-Graduate" self-paced course or demonstrated equivalent competencies. F.S.

ACCT 503. Advanced Financial Accounting. 3 Credits.
Accounting for inter-corporate investments, business combinations, and other advanced financial accounting topics. Prerequisite: Permission of MAcc Director. F.S.

ACCT 504. Seminar in Auditing. 3 Credits.
Expands understanding of the auditing function and provides a framework for analyzing contemporary auditing and assurance issues. Prerequisite: Permission of MAcc Director. F.

ACCT 506. Accounting Systems. 3 Credits.
This course examines business processes and controls within the context of enterprise resource planning systems (ERP), with an emphasis on the financial cycle. Prerequisite: Permission of MAcc Director. S.

ACCT 507. Advanced Managerial Accounting. 3 Credits.
Functional uses of accounting in management of the enterprise.
ACCT 508. Fraud Examination. 3 Credits.
Focuses on understanding types of fraud as well as collecting and evaluating evidence relating to preventing and detecting frauds. Evidence gathering methods will include the examination of documents, publicly available information, and standard practices for interviews and interrogations. Prerequisite: ACCT 405 or equivalent.

ACCT 509. Accounting Information for Decision and Control. 3 Credits.
Management accounting concepts and their application in internal planning, control, and decision-making. Prerequisite: ACCT 502. F.S.

ACCT 510. Taxation of Individuals. 3 Credits.
This graduate-level course covers federal taxation of individuals. Prerequisite: Permission of MAcc Director. F.

ACCT 511. Taxation of Businesses. 3 Credits.
This graduate-level course covers federal taxation of business organizations. Prerequisite: Permission of MAcc Director. S.

ACCT 512. Accounting for Governments & Nonprofits. 3 Credits.
This course covers accounting for governmental and nonprofit entities, including fund accounting. Prerequisite: Permission of MAcc Director. S.

ACCT 521. Financial Accounting I. 3 Credits.
This is the first course in financial accounting for graduate students that has a preparer orientation, but also provides a foundation for analyzing financial statements. Specific content focuses on assets and current liabilities as well as the formats and uses of the primary financial statements. Prerequisite: Permission of MAcc Director. F,S,SS.

ACCT 522. Financial Accounting II. 3 Credits.
This is the second course in the financial accounting sequence for graduate students. The course has a preparer orientation, but also provides a foundation for analyzing financial statements. Prerequisite: ACCT 521 or Permission of MAcc Director. F,S,SS.

ACCT 523. Financial Accounting III. 3 Credits.
This course is part of the graduate financial accounting sequence. The course has a problem-solving orientation, and involves the application of accounting principles to complex transactions and topics including deferred taxes, leases, and pensions. Prerequisite: ACCT 522 or permission of the Director of the Master of Accountancy program. F,S,SS.

ACCT 525. Audit & Assurance Services. 3 Credits.
Examines the role that assurance services play in improving the quality of information and its usefulness for decision making. Materiality and risk assessment are considered along with processes and controls in relation to financial statement audits. Prerequisites: ACCT 522 and ACCT 506, or Permission of MAcc Director. S.

ACCT 526. Advanced Business Law for Accountants. 3 Credits.
Examines legal topics relevant to accountants and financial professionals including securities law, commercial paper, secured transactions, professional liability, corporations and partnerships. Prerequisite: Permission of MAcc Director. S.

ACCT 527. IT Governance and Audit. 3 Credits.
This course introduces topics related to information technology governance and audit, and their roles in internal control and risk management in accounting. Prerequisite: Admission into the Master of Accountancy program or permission of the Director of the Master of Accountancy program. On demand.

ACCT 560. Personal Accountability & Ethics. 3 Credits.
Examines foundations of ethical behavior with an emphasis on personal accountability. Issues, regulations, and cases relevant to accountants and auditors are examined. Approaches for dialogue in the context of ethical issues are introduced. Includes a service project component. Prerequisite: Permission of MAcc Director. F.

ACCT 561. Accounting Ethics and Leadership. 3 Credits.
Accounting professionals have a special role in assuring the quality of financial reports, and in conveying useful information to stakeholders throughout society. Identifying, and being able to effectively respond to, ethical issues are important skills for accounting professionals. This course explores the concepts of ethical thinking, professional behavior, integrity, and independence, as well as specific principles as identified in the Codes of Professional Conduct. The ethical tone of an organization is set by its leaders, and thus an understanding of leadership, and how managers can effectively lead others in a responsible manner, is important to understand from both the perspective of being a leader, and working with leaders in an organization. Prerequisite: Admission into the Master of Accountancy program or permission of the Director of the Master of Accountancy program. F,S,SS.
ACCT 411. Business Income Taxation. 3 Credits.
Federal income tax relating to corporations and partnerships. Introduction to estate and gift tax and fiduciary income tax. Prerequisites: ACCT 302; Senior Standing; declared CoBPA majors only. F.S.

ACCT 416. Business Law for Accountants. 3 Credits.
Both foundational and advanced topics in business law relevant for the practice of public accountancy including agency law, contracts, negotiable instruments, ethics, legal representation in business, and the impact of selected governmental regulations on businesses. Prerequisites: Declared CoBPA majors or students admitted to the Master of Accountancy program, only. F.S.SS.

BADM Courses

BADM 500. The Successful MBA—Executive Skills. 2 Credits.
Effective leadership requires a diverse set of skills; it requires vision, strategy, planning and inspiration, yet all of these skills are hinged on communication. Executives must communicate across various channels, use multiple modes, and communicate with individuals and teams. This course presents communication as integral to management strategy and as a critical component for success in the workplace. In this course we examine the fundamental skills necessary to succeed as an executive, examine fundamental communication strategies, and then put them into practice. Further, because effective group communication is a necessity in today’s workplace we will learn and practice skills in designing presentations. The schedule will reflect eight learning modules that discuss professionalism, managing impressions, crafting arguments, managing conflict, leveraging diversity, working in teams, presenting in groups, and reflecting on skills, motivators and influences. F.S.SS.

BADM 502. Business Research Methods. 3 Credits.
A study of the methodology of research involving research design, problem definition, information sources, data collection instruments, and the organization and writing of a research paper. Prerequisite: Completion of MBA foundation courses or consent of instructor.

BADM 597. Graduate Cooperative Education. 1-3 Credits.
A practical experience with an employer closely associated with the student’s academic area. A written report describing the student's job related experiences will be prepared. Prerequisite: Approval of MBA director. Repeatable to 3 credits. S/U grading.

BADM 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

BADM 997. Independent Study. 2 Credits.

BADM 998. Thesis. 4 Credits.

ECON Courses

ECON 503. Government and Business. 3 Credits.

ECON 504. Microeconomic Theory & Applications. 3 Credits.
Economic theory and methodology: theory of consumer behavior and demand; theory of production and distribution; equilibrium in commodity and factor markets; general equilibrium and welfare; behavior of economic agents in imperfect competition. Particular attention is given to efficiency and equity ramifications of perfectly competitive economic systems. Prerequisite: ECON 308. Prerequisite or Corequisite: ECON 416. F.

ECON 505. Macroeconomic Theory & Applications. 3 Credits.
Advanced study of macroeconomic theoretical models with particular attention to the analysis of business cycles, income growth and evaluation of public policies concerned with inflation and unemployment. Prerequisite or Corequisite: ECON 416. S.

ECON 506. Econometrics. 3 Credits.
Econometric methods, theory, and applications. Topics include linear regression, least-squares estimation, inference, and hypothesis testing. Prerequisite: Admission to the MBA or MSAE program, or department consent required. S.

ECON 509. Macroeconomic Decision Making. 3 Credits.
Examination and utilization of theory and empirical evidence on macroeconomics in the business decision-making process will be stressed. Particular emphasis will be placed on inflation, interest rate changes, business taxation, and exchange rate movements. Prerequisites: ECON 202 and MATH 146.

ECON 510. Time Series Methods & Applications. 3 Credits.
Statistical models and applied econometrics methods relevant to estimation and the testing of economic relationships . Prerequisite: ECON 506. S.

ECON 514. Advanced Managerial Economics. 3 Credits.
Microeconomic analysis applied to business decision-making. Topics include: the nature and scope of the firm, strategic decisions concerning product line, pricing, entry or exit from specific markets and the internal organization of the firm. Case studies are utilized as a main method of analysis. Prerequisites: ECON 201, ISBC 217 and MATH 146, or consent of instructor.

ECON 524. Advanced International Economics. 3 Credits.
This course provides a broad overview of international trade theory, policy, and/ or international finance. The course focuses on empirical application based on these theories. Prerequisite: ECON 506. Prerequisite or Corequisite: ECON 416 and ECON 504. F.

ECON 534. Further Topics in Econometrics. 3 Credits.
This is an applied course in economics, the purpose of which is to build on the tools learned in previous coursework, learn new tools, and discover how to apply these tools to the analysis of data from the real world. The course includes theory, though the focus is on applying the tools of modern econometrics to the study of cross sectional, time series, and panel data. Prerequisites: ECON 506. F.

ECON 545. Quantitative Methods for Impact Evaluation & Causal Inference. 3 Credits.
This course aims to familiarize the student with the current literature on the economics and econometrics of policy and program evaluation . Prerequisites: ECON 506. S.

ECON 555. Demographic Methods for Economics. 3 Credits.
We examine the three key demographic processes: mortality, fertility, and migration . The course emphasis will be on model development for each of the processes. Applications include economic policy issues such as pensions, medical insurance , and other current issues. Prerequisite: ECON 210. SS.

ECON 575. Advanced Special Topics. 1-3 Credits.
Topics of course will change from semester to semester but will typically emphasize an important aspect of economic theory or a significant issue in economic policy. Repeatable to 6 credits with different topics. Repeatable to 6 credits.

ECON 580. Economic Development: Global, National, and Regional Issues. 3 Credits.
The first part of this course focuses on growth theories, globalization and economic development and sustainable growth among less developed, developing, and more developed countries, as well as countries in transition to market economies. The second part of the course specifically examines economic development for advanced nations, incorporating rural, urban and regional economic analysis. Issues such as rural technology, employment, poverty, housing, transportation, location problems, industrialization, urbanization and sustainable growth in North Dakota and North Central Region are explored. Prerequisite: Department consent. F.

ECON 592. Research in Economics. 2-3 Credits.
Research work and use of original documents; collecting of material and preparing of special topics and bibliographies; familiarizing the student with government publications and other material available for study of economic problems.

ECON 596. Applied Economics Research Seminar. 3 Credits.
Seminar course intended to strengthen and further develop essential skills of research and formal presentation (written and oral) for both academic and professional audiences. Students will apply these skills to the development of their individual Independent Study or Thesis Project Proposal. Enrollment is restricted to MSAE degree students who plan to complete their Independent Study or Thesis in the following academic year. Prerequisites: ECON 504, ECON 505, and ECON 506. SS.

ECON 597. Economic Research Internship. 1-3 Credits.
An internship designed to provide the student with an opportunity for participating in a supervised work experience directly related to the field of training. Students will work closely with the program adviser in planning the internship with an approved cooperating institution. Prerequisite: Permission of program director. Repeatable to 3 credits. F,S,SS.

ECON 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.
ECON 997. Independent Study. 3 Credits.
The independent study is a capstone for MSAE students on the non-thesis track. The course requires the student to investigate a topic or research question in applied economics that is assigned by the instructor. The student will prepare a research paper demonstrating his/her ability to creatively apply the various methods and perspectives taught in the MSAE program in addressing the assigned problem. Students will also be required to develop a presentation for their paper. Prerequisites: ECON 504, ECON 505, and ECON 506. F.S.

ECON 998. Thesis. 4 Credits.
The thesis is an original research project completed under the supervision of a thesis committee.

Undergraduate Courses for Graduate Credit

ECON 324. Public Finance. 3 Credits.
Growth and effects of the public sector of the economy emphasizing effects of taxation and spending or borrowing and debt management on efficiency and use of economic resources. Prerequisites: ECON 201 and ECON 202.

ECON 338. International Economics. 3 Credits.
Economic basis for gain in international trade; capital and population movements; international disequilibrium and the process of balance-of-payments adjustments; tariffs, underdeveloped countries. Prerequisites: ECON 201 and ECON 202. F.S.

ECON 341. Labor Economics and Labor Relations. 3 Credits.
A survey of the nature and causes of the economic problems of the American wage and salary earner and of the attempts of wage earners and society, through organizations and legislation, to alleviate these problems. The course comparatively surveys the history and systematic theories of labor movements and the market and institutional influences on wages and employment. Particular emphasis will be placed on the law of industrial relations, employment and income access, and the adjustment of labor disputes. Prerequisites: ECON 201 and ECON 202. F.

ECON 355. Government Regulation of Business. 3 Credits.
An exploration of the many ways that federal and state governments regulate business activity. Government regulation falls into three broad areas: economic regulation; social regulation; antitrust laws. The historical development of regulation, from both a legal and economic perspective, will be discussed. Particular attention will be paid to the current trend toward deregulation of previously regulated industries such as airlines, telecommunications, and trucking. Prerequisites: ECON 201 and ECON 202. F.

ECON 400. History of Economic Thought. 3 Credits.
Broad overview of the major schools of thought including Mercantilist, Physiocrat, Classical, Marxian, Socialist, Historical, Austrian, Neoclassical, Institutional, Keynesian, and Monetarist. The coverage includes value theory, income/expenditure theory, growth/development theory, scientific method, scope and public policy. Prerequisites: ECON 105 or ECON 201, and ECON 202. S.

ECON 410. Empirical Methods in Economics I. 3 Credits.
This course is an introduction to econometrics, the joint area of economics and statistics dealing with the application of statistics to economic problems. The course objectives are to acquire a basic understanding of the theory and methods of econometrics and to gain practical experience in utilizing these methods. The students will use the tools developed in the course in homework and written assignments so that they can develop an insight to theory and its application. Prerequisites: ECON 201, ECON 202 and ECON 210. F.

ECON 411. Economic Forecasting. 3 Credits.
An introduction to Economics Forecasting and Time Series Analysis. The course will cover specifications and estimation of ARMA models, seasonality, non-stationarity, unit roots and forecast evaluations. Empirical applications are used throughout the course. Prerequisite or Corequisite: ECON 410 or ECON 506. S.

ECON 416. Mathematics for Economists. 3 Credits.
Study of mathematical methods in the areas of introductory calculus and linear algebra, and their application to economic analysis. Mathematical analysis of static and dynamic equilibrium models, growth models, distribution, production functions, cycles, activity analysis, mathematical programming, and model building. Prerequisite: MATH 146 or MATH 165. Prerequisite or Corequisites: ECON 308. F.

ECON 438. International Money and Finance. 3 Credits.
Identification of key international financial concepts and analysis of their relationships in the international money and capital markets; determination of the balance of payments and exchange rates; and examination of alternative organizations of the international monetary system. Prerequisite: ECON 303. F.

ENTR Courses

ENTR 575. Special Topics. 3 Credits.
Specific topic will vary from offering to offering at the discretion of the department. Departmental permission will be required for enrollment. Course may be repeated once with topic change. Prerequisite: Departmental permission. Repeatable to 6 credits.

ENTR 580. Seminar in Social Entrepreneurship. 3 Credits.
Social Entrepreneurship is a rapidly growing, interdisciplinary area of interest that draws on entrepreneurial knowledge and skills to craft innovative businesses that address social needs. This course explores current trends in both the private and social sectors, which are creating space for innovation and opportunities for individuals to apply their business skills to drive positive and large scale social change. We will explore major opportunities and challenges presented by social enterprise through examining a variety of models ranging from social purpose to the creation of social ventures. Students will work in teams to conduct a feasibility study for a social entrepreneurship related project. Through the project, students will enhance and apply their understanding of business strategies and processes that enhance sustainability and social impact. These strategies can include launching revenue-generating enterprises, developing a marketing plan for an existing social enterprise, or creating strategic partnerships with the private sector. Students will also gain practical skills necessary to develop and manage a high-impact social venture. F, odd years.

FIN Courses

FIN 501. Managerial Finance. 3 Credits.
The development of financial decision-making skills, using the case-analysis method, through application of financial theory to topical areas of analysis, planning, control, asset management, financial instruments, markets, capital structure, dividend policy, cost of capital, etc. Prerequisite: Successful completion of Ivy Software’s “Understanding Corporate Finance” self-paced course or demonstrated equivalent competencies. F,S.

FIN 520. Investment Theory and Management. 3 Credits.
An introductory course designed for MBA students in the study of the usage and valuation of the major investment vehicles popular today. Although the ultimate objective is to develop a conceptual framework in which the student can expand his or her knowledge of the investment field, the course is taught in a practical fashion and incorporates materials from both the Chartered Financial Analyst (CFA) and Certified Financial Planner (CFP) curricula. Prerequisite: FIN 501 or consent of instructor.

FIN 575. Special Topics. 3 Credits.
Specific topic will vary from offering to offering at the discretion of the department. Departmental permission will be required for enrollment. Prerequisites and/or corequisites may be required depending upon the special topic selected. Course may be repeated up to a total of nine credits with permission of department. Prerequisite: Departmental permission. Repeatable to 9 credits.

Undergraduate Courses for Graduate Credit

FIN 420. Investment Analysis and Portfolio Management. 3 Credits.
Comprehensive study of methods used to evaluate securities. Includes formulation of investment strategy and analysis, design of portfolios for classes of individual investors and institutions, fundamental analysis and portfolio performance evaluation. Extensive use of financial databases and software. Prerequisites: FIN 340 and FIN 360; Junior or Senior Standing; declared CoBPA majors only. F.
FIN 475. Cases in Managerial Finance. 3 Credits.
Introduces students to construction and utilization of financial management decision models using case study examples. Topics evaluated include working capital management, capital budgeting, cost of capital, capital structure, dividend policy, valuation, risk-return, and special topics of financial management. Students are required to develop original simulation models, prepare formal case reports, and orally and visually present their results. Prerequisites: FIN 340 and FIN 360; Junior or Senior Standing; declared CoBPA majors only. S.

ISBC Courses

ISBC 510. Business Intelligence. 3 Credits.
A business intelligence (BI) system is an information system that supports decision making process. BI is also about creating strategic value for organizations based on data. This course provides critical thinking and self-learning abilities by discovering the business intelligence and data analytic challenges. The expected outcome of the course will allow each student to have a solid understanding of current and emerging issues and best practices of data visualization and data analytics. Students will also gain a strong business process analysis experience. The course will challenge each student in her/his ability to use big data, predictive data analysis, data gathering techniques, data warehouse, knowledge management, data mart, and data mining systems. These challenges are becoming a prevalent factor in the present turbulent business environment. This course equips students with an understanding of techniques in data visualization and data analytics, and will culminate in database implementation exercises conducted by students. Prerequisite: Admission to the MBA program or department consent required. F,S.

ISBC 517. Advanced Accounting Systems. 3 Credits.
An advanced study of integrated information systems and how these affect business decisions. Prerequisite: ACCT 309 or permission of instructor.

ISBC 520. Communication for the Professional. 3 Credits.
Examines theory and research relevant to understanding the communication process. Topics include strategies of organizing, globalization, technology, power, and diversity.

ISBC 590. Special Topics. 3 Credits.
Specific topic will vary from offering to offering at the discretion of the department. Departmental permission will be required for enrollment. Prerequisites and/or corequisites may be required depending upon the special topic selected. Course may be repeated up to a total of 6 credits with permission of department. Prerequisite: Department permission. Repeatable to 6 credits.

Undergraduate Courses for Graduate Credit

ISBC 330. Database Management. 3 Credits.
This course covers the fundamentals of database design and management. Topics include, but not limited to, database models, database normalization, entity-relationship diagramming, SQL and database implementation and management. The course will provide a balance of theory and practical applications and will culminate in database implementation exercises conducted by students. F,S.

ISBC 430. Database Analytics. 3 Credits.
This course equips students with an understanding of techniques in data analytics with particular emphasis on unstructured data. Coverage includes, but not limited to, database analytics, PL/SQL, advanced SQL, business intelligence, unstructured big data analytics, Hadoop framework in business, data visualization, data warehousing, NoSQL, and in-memory database system. Prerequisite or Corequisite: ISBC 330. F,S.

MGMT Courses

MGMT 501. Quantitative Analysis for Management Decisions. 3 Credits.
The topic of quantitative business modeling is relevant to all business professionals. Management in today's turbulent economic times requires a full breadth of management skills and capabilities. This course provides comprehensive coverage of both traditional management skills and new competencies needed in a turbulent environment characterized by economic turmoil and general uncertainty of the future. This course is designed for any manager who is engaged in solving difficult business problems. The key to problem solving is knowing how to select and then use the right tools. The primary goals of this course are to provide a variety of quantitative models that should be useful in solving business problems, explain how they work, and show how the decision maker can apply and interpret them. This course covers various topics, such as Linear Programming, Sensitivity Analysis, Network Models, Integer Programming, Nonlinear Programming, and Forecasting. Spreadsheet-based tools and techniques will be extensively utilized in building various decision models for effective decision making in this course. Because Excel currently offers the best collection of built-in analytical capabilities, it will be used with this course. Prior experience with Excel is certainly helpful, but it is not required. Prerequisites: Admission to the MBA program and ECON 506. S,SS.

MGMT 505. Organization Leadership and Ethics. 2 Credits.
This course will explore concepts of leadership and ethics in organizations and business. Students will examine major theories of leadership and their application to practice in groups and organizations, models of ethical thinking and behavior, and how managers can effectively lead others in a responsible manner. Prerequisite: Graduate standing.

MGMT 515. Advanced Managerial Theory. 3 Credits.
This course will explore the management of people and organizations. Students will examine concepts of the behavior of individuals and groups within organizations, motivation, decision making, conflict, organization design, and human resource management, and explore the application of theories in management practice. Prerequisite: Graduate standing. F,S.

MGMT 545. Strategic Supply Chain Management. 3 Credits.
Contemporary supply chains are complex systems that must be constantly adapted with the changing environment in which they are functioning. This course will explore the management of supply chains including concepts of supply chain networks, supply chain strategies, and some analytic tools for supply chain performance. It is the vital responsibility of supply chain managers to continuously improve their firm's competitive position in the marketplace. Students will examine how supply chains can be organized effectively (strategic) and efficiently (operational) in order to satisfy the market, customer demand, and supply chain trading partners. Prerequisites: Admission to the MBA program and completion of "Business Math and Statistics" course from Ivy Software.

MGMT 575. Special Topics. 3 Credits.
Specific topic will vary from offering to offering at the discretion of the department. Departmental permission will be required for enrollment. Prerequisites and/or corequisites may be required depending upon the special topic selected. Course may be repeated up to a total of 9 credits with permission of department. Prerequisites: Departmental permission. Repeatable to 9 credits.

MGMT 585. Advanced Strategic Management. 3 Credits.
An integrating course designed to develop coordinating ability and experience in the decision-making process. Taught from the point of view of the top management and by the case method, the course develops understanding of an overall point of view, through analysis of actual business situations, and an appreciation of the relations of the production department to other departments and to the business as a whole. Concluding cases place emphasis on the responsibilities of business enterprise to the community and to society generally. Prerequisites: ACCT 509, MGMT 515, MKRT 510 and FIN 501, or consent of instructor.

MGMT 596. Individual Research. 2-4 Credits.

MGMT 597. Readings in Management. 1-3 Credits.
Repeatable to 3 credits.

MGMT 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

MGMT 997. Independent Study. 2 Credits.

MGMT 998. Thesis. 1-15 Credits.
Undergraduate Courses for Graduate Credit

MGMT 361. Managerial Negotiations. 3 Credits.
A survey of negotiation, mediation, arbitration, and emerging methods of alternative dispute resolution. Students will be required to engage in small and large group discussions, simulated negotiations and mediations in addition to regular reading assignments. This course is designed to help students understand their bargaining position in a variety of settings, devise negotiating strategies, and build their persuasive abilities and self-confidence in negotiations. Prerequisite: MGMT 300 with grade of C or better. On demand.

MGMT 400. Organizational Theory and Analysis. 3 Credits.
The course is designed to acquaint students with some of the alternative ways in which organizations may be designed to accomplish their tasks. The course reviews the development of organization theories, their current status, and their future. Emphases are placed on the analyses of system theories pertaining to structure, process, and context. Prerequisites: MGMT 300 with grade of C or better, Junior or Senior standing, and declared CoBPA majors only. Prerequisite or Corequisite: MGMT 310 with grade of C or better. F.S.

MGMT 407. Wage and Salary Administration. 3 Credits.
The role of a wage and salary administrator is studied. The course focuses on the fundamentals of wage theory, job evaluation and pricing, employee evaluation, individual and group incentive plans, benefits, and managerial/executive compensation. Prerequisites: MGMT 302 with grade of C or better, Junior or Senior standing, and declared CoBPA majors only. F.

MGMT 408. Performance Management and Human Resource Management Issues. 3 Credits.
This class explores various performance management approaches used by human resource management professionals and managers to improve work performance in organizations. This course also investigates current issues in the field or human resource management that potentially impact the performance of work. Prerequisites: MGMT 302 with grade of C or better, Junior or Senior standing, and declared CoBPA majors only. S.

MGMT 409. Union-Management Relations. 3 Credits.
This course provides the student with an overview of the role of labor unions in contemporary organizations. The primary emphasis of the course is on the collective bargaining process. Students are engaged in simulated collective bargaining processes involving negotiations, mediation, arbitration, and final contractual agreements. Causes of industrial disputes and grievance arbitration are also covered. Prerequisites: MGMT 302 with grade of C or better, Junior or Senior standing, and declared CoBPA majors only. On demand.

MGMT 420. Multinational Management. 3 Credits.
This course is an introduction to the dynamics of management processes encountered in a multinational business setting. It covers comparative management systems and analysis of various environmental conditions for making effective managerial decisions within a multinational company. Adaptation to different cultures is emphasized as one of the essential components of the successful multinational management equation. Prerequisites: MGMT 300 with a grade of C or better, Junior or Senior standing, and declared CoBPA majors only. On demand.

MRKT Courses

MRKT 510. Strategic Market Planning. 3 Credits.
This course is designed to facilitate an understanding of strategic market planning, with specific emphasis on decisions relating to marketing management. Students will develop an understanding of marketing as both a corporate function and a strategic/tactical managerial activity. Specifically, students will develop a realistic logic and application for marketing management and how marketing strategy is informed by marketing research. Special attention will be given to the marketing function as it impacts customer metrics and organizational performance. Prerequisite: BADM 500. F.S.

MRKT 530. Strategic Relationship Marketing. 3 Credits.
This course is designed to facilitate an understanding of strategic relationship marketing with a significant focus on organizational performance and the accountability of the marketing function. Throughout the course, attention will focus on the relational nature of B2B, B2C, and C2C marketplaces and the impacts of firm level marketing decisions upon firm performance measures (KPIs such as market share, sales, profit, call center productivity and efficiency, and customer satisfaction/loyalty). Macro topics covered include relationship, differential advantage, segmentation, buyer behavior, marketing research, demand forecasting, and marketing planning. Specific strategic and tactical decisions examined include the relational outcomes of R & D expenditures, conducting and interpreting marketing research, and marketing mix elements of products, pricing, distribution, sales force and communications decisions. In sum, this course is designed to provide a strategic relational paradigm for understanding B2B, B2C and C2C marketing and provide a “hands on” learning experience in marketing analysis, planning, and decision making towards the end goals of overall firm performance and customer satisfaction. Prerequisite: Graduate standing.

MRKT 540. Marketing Seminar. 3 Credits.
Emerging topics in the field of marketing. Prerequisite: MRKT 305.

MRKT 575. Special Topics. 3 Credits.
Specific topic will vary from offering to offering at the discretion of the department. Departmental permission will be required for enrollment. Prerequisites: and/or corequisites may be required depending upon the special topic selected. Course may be repeated up to a total of 9 credits with permission of department. Prerequisites: Departmental permission is required. Repeatable to 9 credits.

MRKT 592. Graduate Research in Marketing. 1-3 Credits.
Repeatable to 6 credits. Prerequisites: BADM 502 and consent of instructor. Repeatable to 6 credits.

MRKT 595. Graduate Readings in Marketing. 1-3 Credits.
Repeatable to 6 credits. Prerequisites: Consent of instructor is required. Repeatable to 6 credits.

MRKT 996. Continuing Enrollment. 1-12 Credits.
Repeatable.

MRKT 997. Independent Study. 2 Credits.

MRKT 998. Thesis. 1-15 Credits.

Undergraduate Courses for Graduate Credit

MRKT 431. Customer Relationship Management (CRM). 3 Credits.
This course examines customer relationship management (CRM) and its application in marketing, sales, and service. It will include the use of Microsoft Dynamics CRM and Microsoft Social Engagement. Effective CRM strategies help companies align business processes with customer centric strategies using people, technology, and knowledge. Companies strive to use CRM to optimize the identification, acquisition, growth and retention of desired customers to gain competitive advantage and maximize profit. Anyone interested in working with customers and CRM technology and would like to be responsible for the development of any major aspect of CRM will find this course beneficial. Emphasis is given on conceptual knowledge, real-world projects, and hands-on learning using Microsoft Dynamics CRM software. CRM training modules and software are used throughout the semester. Prerequisites: MRKT 305, Junior or Senior Standing, and declared CoBPA majors only. F.S.

Master of Business Administration

Admission Requirements

1. A four-year bachelor’s degree from a recognized college or university.
2. An overall grade point average of at least 3.00 in the undergraduate degree program or of at least 3.25 for the last two years, or equivalent, of undergraduate work (based on 4.00 scale).
3. Completion of the Graduate Management Admission Test (GMAT) with a score that equals or exceeds an overall total score of 500. In certain circumstances, applicants may substitute the GRE (with similar percentile scores expected to those noted above). This situation will be determined on a case-by-case basis.
4. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.
5. Minimum competence in business math and statistics, accounting, economics, and finance. This competence is normally demonstrated by having a bachelor’s degree in business administration, previous equivalent course work in each of four subject areas, or by successful completion of self-paced boot camp courses on these topics from Ivy Software (https://www.mbpaprepworks.com/local/iomad_signup/signup.php?id=128&code=UNDakota).

M.B.A. Prerequisite Competence

Applicants must demonstrate a minimum competence in business math and statistics, accounting, economics, and finance. Competence in these foundational topics can be demonstrated in three ways:

1. Possessing a bachelor’s degree in business administration, with the grade point requirements stated above.
2. Completion of equivalent course work in the four topics areas, with a grade of “B” (or the equivalent) or better in each course. The MBA Program Director will determine if previous course work meets the expectations for entering students.
3. Successful completion of self-paced online boot camp courses on these topic areas from Ivy Software (https://www.mbpaprepworks.com/local/iomad_signup/signup.php?id=128&code=UNDakota). Students can go directly to Ivy Software’s web site for registration information. Students must achieve a score of 80% or greater in each course in order to successfully complete the prerequisite requirement. Students will have a maximum of 2 attempts to successfully complete each course; students that fail to pass the boot camp course after 2 attempts will be required to complete an undergraduate course judged by the M.B.A Program Director to be equivalent to that subject, with a grade of “B” (or the equivalent) or better.

Ivy Software Boot Camp Course List

1. Business Math and Statistics
2. Financial Accounting
3. Fundamentals of Economics
4. Understanding Corporate Finance

Degree Requirements

Students seeking a Master’s degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Master of Business Administration Program.

The M.B.A. degree program is an interdisciplinary program taught by the faculty in several departments within the College of Business and Public Administration. The M.B.A. Program Director is responsible for coordinating all aspects of the program. Business courses carrying graduate credit status from the Department of Accounting, Economics and Finance, Marketing, Management, and Political Science and Public Administration, and the School of Entrepreneurship are described elsewhere in the graduate catalog. The M.B.A. degree program requirements are:

1. A minimum of 43 semester credits of academic work. The program includes 34 credit hours of required core course credits and an additional 9 credit hours in a required concentration.
2. The 34 required core course credits are organized into 4 modules: Executive Management, Business Analytics, Financial and Economic Analysis, and Strategy.
3. At least one-half of the credits must be at or above the 500-level. A maximum of one-fourth (usually 9 semester credits) of the credit hours required may be transferred from another institution.
4. The requirement of the final examinations for the M.B.A. degree is satisfied by the successful completion of MGMT 585 Advanced Strategic Management. MGMT 585 Advanced Strategic Management has four prerequisites which MUST be completed prior to enrollment:
   a. ACCT 509 Accounting Information for Decision and Control
   b. FIN 501 Managerial Finance
   c. MGMT 515 Advanced Managerial Theory
   d. MRKT 510 Strategic Market Planning
5. Students are required to make a final presentation to a panel of assurance of learning reviewers during their last semester of study, and maintain an assurance of learning portfolio throughout their program of study.

The M.B.A. curriculum includes the following required courses:

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<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>MGMT 505</td>
<td>Organization Leadership and Ethics</td>
<td>2</td>
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<tr>
<td>MGMT 515</td>
<td>Advanced Managerial Theory</td>
<td>3</td>
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<tr>
<td>BADM 500</td>
<td>The Successful MBA--Managerial Theory</td>
<td>2</td>
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Business Analytics Module

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<tbody>
<tr>
<td>ISBC 510</td>
<td>Business Intelligence</td>
<td>3</td>
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<td>ECN 506</td>
<td>Econometrics</td>
<td>3</td>
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<tr>
<td>MGMT 501</td>
<td>Quantitative Analysis for Management Decisions</td>
<td>3</td>
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Financial and Economic Analysis Module

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<tbody>
<tr>
<td>ACCT 502</td>
<td>Financial Reporting and Decision Making</td>
<td>3</td>
</tr>
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<td>ACCT 509</td>
<td>Accounting Information for Decision and Control</td>
<td>3</td>
</tr>
<tr>
<td>FIN 501</td>
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Strategy Module

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<td>3</td>
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<tr>
<td>MGMT 545</td>
<td>Strategic Supply Chain Management</td>
<td>3</td>
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<tr>
<td>MGMT 585</td>
<td>Advanced Strategic Management</td>
<td>3</td>
</tr>
</tbody>
</table>

Concentration

<table>
<thead>
<tr>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
</tr>
</tbody>
</table>

Total Credits 43

M.B.A. students can choose among the following concentrations:

General Concentration

Students can choose 9 credit hours for the General Concentration chosen from courses offered at the 300-, 400- and 500-level in the areas of Accounting, Economics, Entrepreneurship, Finance, Information Systems and Business Communications, Marketing, Management, and Political Science & Public Administration, as well as other fields within the CoBPA and across UND. MBA students taking courses at the 300- and 400-level for graduate credit are expected to perform at a higher level, both in the quality and quantity of work. All General Concentration courses must be approved by the M.B.A. Program Director prior to enrollment.

Business Analytics Concentration

Students can choose to focus on business analytics beyond the M.B.A. core business analytics module by choosing 9 credit hours from the following list of courses. Other courses may be substituted for those in the list below, but must be approved by the M.B.A. Program Director prior to enrollment.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 411</td>
<td>Economic Forecasting</td>
<td>3</td>
</tr>
<tr>
<td>ECON 510</td>
<td>Time Series Methods &amp; Applications</td>
<td>3</td>
</tr>
<tr>
<td>ECON 534</td>
<td>Further Topics in Econometrics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 545</td>
<td>Quantitative Methods for Impact Evaluation &amp; Causal Inference</td>
<td>3</td>
</tr>
</tbody>
</table>

Data Management Concentration

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISBC 330</td>
<td>Database Management</td>
<td>3</td>
</tr>
<tr>
<td>ISBC 430</td>
<td>Database Analytics</td>
<td>3</td>
</tr>
<tr>
<td>EFR 513</td>
<td>Large Dataset Management and Analysis</td>
<td>3</td>
</tr>
<tr>
<td>EFR 530</td>
<td>Learning Analytics</td>
<td>3</td>
</tr>
<tr>
<td>EFR 535</td>
<td>Data Analytics and Visualization with R</td>
<td>3</td>
</tr>
</tbody>
</table>

Government and Business Concentration

Students can choose to focus on government and business by choosing 9 credit hours from the following list of courses. Other courses may be substituted for those in the list below, but must be approved by the M.B.A. Program Director prior to enrollment.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>POLS 502</td>
<td>Problems in State and Local Governments</td>
<td>3</td>
</tr>
<tr>
<td>ECON 503</td>
<td>Government and Business</td>
<td>3</td>
</tr>
<tr>
<td>POLS 531</td>
<td>Foundations of Public Administration</td>
<td>3</td>
</tr>
<tr>
<td>POLS 532</td>
<td>Public Policy</td>
<td>3</td>
</tr>
<tr>
<td>POLS 533</td>
<td>Administrative Ethics in the Public Sector</td>
<td>3</td>
</tr>
<tr>
<td>POLS 535</td>
<td>Public Organizations</td>
<td>3</td>
</tr>
<tr>
<td>POLS 537</td>
<td>Program Evaluation</td>
<td>3</td>
</tr>
<tr>
<td>POLS 538</td>
<td>Public Budgeting and Financial Administration</td>
<td>3</td>
</tr>
</tbody>
</table>
Admission Requirements

1. Students are required to apply to both the Law School and the School of Graduate Studies. Admission recommendations will be made to the School of Graduate Studies by the Director of the M.B.A. Program and approved by the Graduate Dean. The Law School Admissions Committee will determine admission into the Law School.

2. Students are expected to fulfill the minimum competence requirements prior to beginning M.B.A. coursework.

3. Students pursuing a J.D. degree and wishing to add the M.B.A. degree must do so no later than the third semester of the J.D. program.

4. Admission requirements of each program will remain the same in the joint program. Students who already have completed courses similar to those in the M.B.A. curriculum may be required to choose substitutes from the graduate credit offerings listed in this catalog. Substitutions require the prior approval of the M.B.A. Director prior to registration. Students are expected to take a workshop or course of study in cultural language studies from the foreign college/university.

Final Examinations. The requirement of the final examinations for the M.B.A. degree is satisfied by the successful completion of MGMT 585 Advanced Strategic Management.

Master of Business Administration/Juris Doctor Combined Program

Admission Requirements

1. Students are required to apply to both the Law School and the School of Graduate Studies. Admission recommendations will be made to the School of Graduate Studies by the Director of the M.B.A. Program and approved by the Graduate Dean. The Law School Admissions Committee will determine admission into the Law School.

2. Students are expected to fulfill the minimum competence requirements prior to beginning M.B.A. coursework.

3. Students pursuing a J.D. degree and wishing to add the M.B.A. degree must do so no later than the third semester of the J.D. program.

4. Admission requirements of each program will remain the same in the joint program.

Degree Requirements

If each degree were earned separately, a student would be required to complete 90 credit hours for the J.D. degree and 43 hours for the M.B.A. The joint degree program will enable a student to receive the two degrees upon completion of 81 law credit hours and 34 M.B.A. credit hours. The School of Law thus accepts 9 credit hours of M.B.A. coursework that will be applicable toward the J.D. degree, and the College of Business and Public Administration accepts 9 credit hours of J.D. courses toward the M.B.A. degree. The total credits required for each degree will be unchanged, because each program will accept credits toward the other degree.

In addition to the required courses for all students earning the J.D. degree, students enrolled in the joint degree program must successfully complete the following School of Law courses: Business Associations, and at least two Commercial Law courses. Other School of Law courses may be chosen to fulfill elective requirements.

Sample Curricular Plan (degree completion in four years)

The first year of the joint degree program will consist of the required curriculum in the School of Law. The third semester of the joint degree program will usually consist of law school courses, with M.B.A. Curriculum courses beginning in the fourth semester. To promote the integration of the two courses of study, courses after the third semester usually will be taken in each of the schools concurrently, rather than having the student located exclusively in one school or the other for an entire semester. Note: This timetable assumes that all undergraduate prerequisite courses have been completed prior to entering the joint program.

Semester 1 (Fall only)

- Required first year curriculum in the School of Law: 16 credits

Semester 2 (Spring only)

- Required first year curriculum in the School of Law: 16 credits

Semester 3

- Courses in the School of Law: 15 credits

Semester 4

- 3 M.B.A. courses: 9 credits
- Courses in the School of Law: 6 credits

Semester 5

- 3 M.B.A. courses: 9 credits
- Courses in the School of Law: 6 credits

Semester 6

- Courses in the School of Law: 6 credits
- 2 M.B.A. courses: 6 credits

Semester 7

- Courses in the School of Law: 7 credits
- 2 M.B.A. courses: 6 credits

Semester 8

- Courses in the School of Law: 9 credits
- 2 M.B.A. courses: 6 credits

Total Credits: 115

Normally, the joint program will be completed in only four years. With summer school classes it may be possible to obtain both degrees even more quickly. All degree requirements in the Law School must be completed within 84 months of starting the program. Both degrees will be awarded simultaneously after all degree requirements are met in both programs.

Chemistry

M.S. in Chemistry (p. 358)

B.S./M.S. Combined Degree in Chemistry (p. 357)

Ph.D. in Chemistry (p. 358)

Courses

CHEM 508. Departmental Lecture. 1 Credit.

S/U grading.
CHEM 509. Graduate Seminar. 1 Credit.
Student presentation of a seminar based on current peer-reviewed literature.

CHEM 510. Intermediate Inorganic Chemistry. 3 Credits.
Review of atomic concepts, molecular topologies, and symmetry. Theories of bonding including directed and undirected atomic orbital view. An introduction to the chemistry of transition metals. Prerequisite: CHEM 454 or an equivalent approved by the department.

CHEM 511. Advanced Inorganic Chemistry. 3 Credits.
Structure of coordination compounds, mechanisms of inorganic reactions, biochemical applications of inorganic chemistry. Three hours lecture per week. Prerequisite: CHEM 510.

CHEM 512. Organometallic Chemistry. 3 Credits.
Preparation, bonding and reactivity of organometallic compounds, both main group and transition metal. Prerequisite: CHEM 454.

CHEM 519. Special Topics in Inorganic Chemistry. 1-3 Credits.
Topic of current interest to be considered each semester; may be repeated for credit if topic is different. Prerequisite: CHEM 510. Repeatable.

CHEM 520. Advanced Organic Chemistry I. 3 Credits.
Reaction mechanisms. Carbonions and radicals. Substitution, elimination and addition reactions. Carbonyl chemistry. Three hours lecture per week. Prerequisite: CHEM 352 or an equivalent approved by the department.

CHEM 521. Advanced Organic Chemistry II. 3 Credits.
Carbocations and carbenes. Oxidations and reductions. Alkylation. Carbonyl additions. Substitution and addition reactions. Three hours lecture per week. Prerequisite: CHEM 352 or an equivalent approved by the department.

CHEM 522. Advanced Organic Chemistry III. 3 Credits.
Photochemistry. Concerted reactions and cycloadditions. Aromatic and heterocyclic chemistry. Transition metals in organic chemistry. Three hours lecture per week. Prerequisite: CHEM 520 or CHEM 521.

CHEM 529. Special Topics in Organic Chemistry. 1-3 Credits.
Topic of current interest. May be repeated for credit if topic is different. Prerequisite: CHEM 520 or CHEM 521. Repeatable.

CHEM 530. Chemical Thermodynamics. 3 Credits.
Application of classical and statistical thermodynamics to chemical equilibrium, phase equilibrium and the physical properties of solutions. Three hours lecture. Prerequisite: CHEM 465 or an equivalent approved by the department.

CHEM 531. Chemical Dynamics. 3 Credits.
Study of the kinetics of complex, coupled chemical reactions in gas and solution phases; dynamics of gas phase reactions. Three hours lecture. Prerequisite: CHEM 465 or equivalent or consent of instructor.

CHEM 532. Quantum Mechanics in Chemistry. 3 Credits.
Application of the time-dependent Schroedinger equation to rotational, vibrational and magnetic spectroscopy; selection rules. Relation of molecular structural parameters and spectroscopic measurements; principles of group theory. 3 hours lecture. Prerequisite: CHEM 464 or an equivalent approved by the department.

CHEM 534. Quantum and Computational Chemistry. 3 Credits.
Study of the electronic structure of atoms and molecules using modern approximation methods; formal aspects of various perturbation and variational techniques as applied to chemical problems. 3 hours lecture. Prerequisite: CHEM 532.

CHEM 537. Graduate Cooperative Education. 1-9 Credits.
Practical experience of applying advanced concepts in chemistry. Experience will vary from student to student and must be coordinated with co-op host. Prerequisites: Permission of Department Chair is required, MS students must have minimum of 26 credits and PhD students must have a minimum of 52 credits. On demand.

CHEM 539. Special Topics in Physical Chemistry. 1-3 Credits.
Topic of current interest. May be repeated for credit if topic is different. Prerequisite: Consent of department. Repeatable.

CHEM 541. Analytical Spectroscopy. 3 Credits.
Fundamentals of analytical spectroscopy including principles of emission spectroscopy, flame photometry, atomic absorption, infrared and Raman spectroscopy, ultraviolet/visible spectroscopy, and fluorescence. 3 hours lecture. Prerequisite: CHEM 461 or an equivalent approved by the department.

CHEM 542. Electrochemical Methods. 3 Credits.
Topics ranging from the fundamentals of electrochemistry (including thermodynamics, kinetics, and mass transfer) to applications of contemporary electroanalytical techniques such as cyclic voltammetry, digital simulation, and spectrophotometry are discussed. Three hours lecture. Prerequisite: CHEM 461 or an equivalent approved by the department.

CHEM 543. Chromatography. 3 Credits.
Fundamentals of modern chromatographic techniques including principles of band broadening, gas chromatography, liquid chromatography, and representative sampling problems. Three hours lecture. Prerequisite: CHEM 461 or an equivalent approved by the department.

CHEM 549. Special Topics in Analytical Chemistry. 1-3 Credits.
Topic of current interest to be considered each semester; may be repeated for credit if topic is different. Prerequisite: CHEM 540. Repeatable.

CHEM 561A. Foundations of Chemistry for Teacher Development. 3 Credits.
Second of a chemistry course sequence intended for: a) teachers planning to qualify to teach high school chemistry; or b) teachers looking to enrich their content knowledge in chemistry for professional development. Topics include elementary principles and theories of chemistry, matter, measurement, atoms, ions, molecules, reactions, chemical calculations, thermodynamics, bonding, molecular geometry, periodicity, gases. May not be used in Ph.D. or Master's programs.

CHEM 561B. Foundations of Chemistry for Teacher Development. 3 Credits.
Continuation of CHEM 561A. Prerequisite: CHEM 561A. On demand.

CHEM 561L. Introduction to Guided Learning in Chemistry. 2 Credits.
First of a chemistry course sequence intended for: a) teachers planning to qualify to teach high school chemistry; or b) teachers looking to enrich their content knowledge in chemistry for professional development. Topics include: chemical nomenclature and structure; periodicity; aqueous reactions; chemical stoichiometry; ionic and covalent bonding; solutions; thermochemistry; gases, liquids and solids; and pedagogical issues. May not be used in Ph.D. or Master's programs.

CHEM 562A. Intermediate Chemistry for Teacher Development. 3 Credits.
Fourth of a chemistry course sequence intended for: a) teachers planning to qualify to teach high school chemistry; or b) teachers looking to enrich their content knowledge in chemistry for professional development. Topics include: Equilibrium and kinetic principles of chemistry; behavior of solutions; rates of reactions; thermodynamics; aqueous equilibria (acid/base, solubility); electrochemical cells; chemical behavior of main-group elements; nuclear chemistry. May not be used in Ph.D. or Master's programs. Prerequisite: CHEM 562L.

CHEM 562B. Intermediate Chemistry for Teacher Development. 3 Credits.
Continuation of CHEM 562A. Prerequisite: CHEM 562A.

CHEM 562L. Intermediate Guided Inquiry Learning in Chemistry. 2 Credits.
Third of a chemistry course sequence intended for: a) teachers planning to qualify to teach high school chemistry; or b) teachers looking to enrich their content knowledge in chemistry for professional development. Topics include: colligative properties; chemical kinetics and equilibrium; acid/base chemistry; thermodynamics; electrochemistry; and pedagogical issues. May not be used in Ph.D. or Master's programs. Prerequisites: CHEM 561L and CHEM 561B.

CHEM 563A. Organic and Biochemistry for Teacher Development. 3 Credits.
Sixth of a chemistry course sequence intended for: a) teachers planning to qualify to teach high school chemistry; or b) teachers looking to enrich their content knowledge in chemistry for professional development. Topics include: hydrocarbons; alcohols; amines; aldehydes and ketones; carboxylic acids and their derivatives; proteins; carbohydrates, lipids; nucleic acids, enzymes; generation of biochemical energy; and pedagogical issues. May not be used in Ph.D. or Master's programs. Prerequisite: CHEM 563L.

CHEM 563B. Organic and Biochemistry for Teacher Development. 3 Credits.
Continuation of CHEM 563A. Prerequisite: CHEM 563A.
CHEM 563L. Guided Inquiry Learning in Organic and Biochemistry. 2 Credits.
Fifth of a chemistry course sequence intended for: a) teachers planning to qualify to teach high school chemistry; or b) teachers looking to enrich their content knowledge in chemistry for professional development. Topics include: hydrocarbons; alcohols; amines; aldehydes and ketones; carboxylic acids and their derivatives; proteins; carbohydrates, lipids; nucleic acids, enzymes; and pedagogical issues. May not be used in Ph.D. or Master's programs. Prerequisites: CHEM 562L and CHEM 562B.

CHEM 599. Research. 1-15 Credits.
Maximum of 15 credits each semester. May be repeated for credit. Repeatable.

CHEM 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

CHEM 997. Independent Study. 1-3 Credits.
Independent study supervised by graduate faculty. Repeatable to 3 credits. F, S, SS.

CHEM 998. Thesis. 1-9 Credits.
Repeatable to 9 credits.

CHEM 999. Dissertation. 1-18 Credits.
Repeatable to 18 credits.

Undergraduate Courses for Graduate Credit
CHEM 471. Quantum Mechanics & Spectroscopy. 3 Credits.
Theory and nature of bonding and structure, spectroscopy, and optics. Prerequisites: CHEM 466, MATH 265, and PHYS 252. S.

Bachelor of Science/Master of Science Combined Degree in Chemistry

Admission Requirements
The applicant must meet the School of Graduate Studies' current minimum general admission requirements as published in the graduate catalog.

1. One year general chemistry, one year organic chemistry. One semester analytical chemistry, and one semester physical chemistry are desired. Students with different background in Chemistry will be placed on the level appropriate to their BS degree and/or prior background.*

2. Satisfy the School of Graduate Studies' English Language Proficiency requirements as published in the graduate catalog.

3. International applicants who have received their bachelor's or master's degree in the United States or English-speaking Canada are not required to submit the TOEFL or IELTS.

4. * Students with no prior BS degree will be admitted to School of Graduate Studies upon completion of 120 credits.
 * Students in this program are not a priority for Departmental financial support through Teaching/Research Assistantship and/or tuition waiver.

Degree Requirements
Students seeking the Bachelor of Science combined with the Master of Science (Non-Thesis Option) Degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Chemistry Department.

Non-Thesis Option (32 credits total):

1. Twelve (12) credits of graduate chemistry.

2. Eighteen (18) elective credits. * May include up to three undergraduate foundation courses, as Scholarly Tools.*

3. One (1) credit of CHEM 509 Graduate Seminar.

4. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution, subject to faculty evaluation on the case-by-case basis.

5. One (1) credit of CHEM 997 Independent Study. Preparation of a written independent study and oral presentation of results to the advisor and interested faculty are required for successful completion of this course.

6. A written Comprehensive Examination (usually an ACS Standardized Test determined by the Advisory Committee) will be taken while in residence. Students will be required to pass the exam.

7. Required Courses:
   a. One (1) CHEM 509 Graduate Seminar.
   b. One (1) credit of CHEM 997 Independent Study. Preparation of a written independent study and oral presentation of results to advisor and interested faculty are required for successful completion of this course.
   c. Eight (8) credit hours of classwork (except the required CHEM 509 and CHEM 997 above) may be replaced with the following Co-op track.
   d. Co-op Track
      CHEM 537 Graduate Cooperative Education 8

   e. Twelve (12) credits of graduate chemistry. May include up to three 400-level courses from the list provided below.
   f. CHEM 441 Instrumental Analysis I - Spectroscopy 2
   f. CHEM 442 Instrumental Analysis II - Electrochemistry 2
   f. CHEM 443 Instrumental Analysis III - Chromatography/Mass Spectrometry 2
   f. CHEM 455 Spectroscopy and Structure 3
   f. CHEM 463 Advanced Synthesis Laboratory 3
   f. CHEM 470 Thermodynamics & Kinetics 3
   f. CHEM 471 Quantum Mechanics & Spectroscopy 3
   f. CHEM 475 Materials Chemistry 3
   f. CHEM 510 Intermediate Inorganic Chemistry 3
   f. CHEM 511 Advanced Inorganic Chemistry 3
   f. CHEM 512 Organometallic Chemistry 3
   f. CHEM 520 Advanced Organic Chemistry I 3
   f. CHEM 521 Advanced Organic Chemistry II 3
   f. CHEM 522 Advanced Organic Chemistry III 3
   f. CHEM 530 Chemical Thermodynamics 3
   f. CHEM 531 Chemical Dynamics 3
   f. CHEM 532 Quantum Mechanics in Chemistry 3
   f. CHEM 541 Analytical Spectroscopy 3
   f. CHEM 542 Electrochemical Methods 3
   f. CHEM 543 Chromatography 3

g. Eighteen (18) elective credits May include up to three undergraduate foundation courses as Scholarly Tools.*+

h. * The following undergraduate foundation courses are eligible for inclusion on graduate programs of study (as Scholarly Tools) as long as they are NOT required for the B.S. degree. Additional assignments and higher standards of accomplishment are required of students taking these courses for graduate credit: CHEM 441 Instrumental Analysis I - Spectroscopy; CHEM 442 Instrumental Analysis II - Electrochemistry; CHEM 443 Instrumental Analysis III - Chromatography/Mass Spectrometry; CHEM 333 Analytical Chemistry; CHEM 361 Problem Solving in Organic Chemistry I; CHEM 362 Problem Solving in Organic Chemistry II; CHEM 454 Inorganic Chemistry II; CHEM 45S Spectroscopy and Structure; CHEM 463 Advanced Synthesis Laboratory; CHEM 466 Fundamentals of Physical and Biophysical Chemistry CHEM 470 Thermodynamics & Kinetics; and CHEM 471 Quantum Mechanics & Spectroscopy. See the Undergraduate catalog for course descriptions.

   + Nine (9) elective credits may come from departments other than Chemistry, but this requires prior approval of student’s committee.
Doctor of Philosophy in Chemistry

Admission Requirements

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. A baccalaureate degree with a major in chemistry.
2. Undergraduate credit in mathematics through integral calculus.
3. One year of physics.
4. Graduate Record Examination General test for all students. (Chemistry subject test also required for all applicants without a baccalaureate degree in Chemistry).
5. Students with a bachelor’s degree may be directly admitted into the Ph.D. program.
6. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

Degree Requirements

Students seeking the Doctor of Philosophy degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Chemistry Department.

The degree of Doctor of Philosophy with a major in chemistry is a research degree and is conferred only in recognition of high achievement in independent scientific research and scholarship.

A candidate for the Ph.D. degree with a major in chemistry must complete a research problem in one of the four fields of chemistry. The scope of the doctoral dissertation will be such as to require the equivalent of at least one full-time academic year of research. Some doctoral research will require a substantially longer time. This research is expected to make a significant contribution to the candidate’s chosen field of chemistry. When the major professor decides that the candidate has satisfactorily completed the research problem, the candidate, in accordance with the regulations of the University, is required to prepare a dissertation covering the research.

1. Completion of 90 semester credits beyond the baccalaureate degree
2. Maintenance of at least a 3.0 GPA for all classes completed as a graduate student.
3. Required Courses:
   a. Two (2) credits of CHEM 509 Graduate Seminar
   b. Nine (9) credits of 500-level courses from one of the three specific major sequences listed below:
   c. Analysis and Applications
      CHEM 541 Analytical Spectroscopy 3
      CHEM 542 Electrochemical Methods 3
      CHEM 543 Chromatography 3
   d. Synthetic
      CHEM 511 Advanced Inorganic Chemistry 3
      CHEM 512 Organometallic Chemistry 3
      CHEM 521 Advanced Organic Chemistry II 3
      CHEM 522 Advanced Organic Chemistry III 3
   e. Theory
      CHEM 475 Materials Chemistry 3
      CHEM 530 Chemical Thermodynamics 3
      or PHYS 543 Statistical Physics 3
      or CHEM 509 Advanced Chemical Engineering Thermodynamics 3
      CHEM 531 Chemical Dynamics 3
      CHEM 532 Quantum Mechanics in Chemistry 3
      or PHYS 539 Quantum Mechanics 3
   f. Nine (9) credits of elective courses (at least six must be 500-level Chemistry courses; three of these nine must be taken in divisions other than the major). Some of these credits may be replaced by Scholarly Tools as described above if deemed appropriate.
   g. CHEM 599 Research 55-57 credits
   h. CHEM 999 Dissertation 10-12 credits

Master of Science in Chemistry

Thesis Option

Admission Requirements

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. A baccalaureate degree with a major in chemistry.
2. A cumulative Grade Point Average (GPA) of at least 2.75 for all undergraduate work or a GPA of at least 3.0 for the junior and senior years of undergrad work.
3. Undergraduate credit in mathematics through integral calculus.
4. One year of physics.
5. Graduate Record Examination General test for all students. (Chemistry subject test also required for all applicants without a baccalaureate degree in Chemistry).
6. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

Degree Requirements

Students seeking the Master of Science (Thesis Option) Degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Chemistry Department.

Thesis Option (32 credits total):

1. A minimum of 32 semester credits in a major field, including the credits granted for the thesis and the research leading to the thesis.
2. At least one-half of the credits must be at or above the 500-level.
3. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.
4. Required Courses:
   a. CHEM 509 Graduate Seminar – 1 credit
   b. One (1) credit of Independent Studies, CHEM 997
   c. Minimum fourteen (14) combined Research and Thesis credits
   d. Six (6) credit hours from one of the three specific major sequences below:
   e. Analysis and Applications
      Select two of the following:
      CHEM 541 Analytical Spectroscopy
      CHEM 542 Electrochemical Methods
      CHEM 543 Chromatography
      CHEM 541 Analytical Spectroscopy
      CHEM 542 Electrochemical Methods
      CHEM 543 Chromatography
      CHEM 541 Analytical Spectroscopy
      CHEM 542 Electrochemical Methods
      CHEM 543 Chromatography
   f. Synthetic
      Select two of the following:
      CHEM 511 Advanced Inorganic Chemistry
      CHEM 512 Organometallic Chemistry
      CHEM 521 Advanced Organic Chemistry II
      CHEM 511 Advanced Inorganic Chemistry
      CHEM 512 Organometallic Chemistry
      CHEM 521 Advanced Organic Chemistry II

   d. Three (3) credits of CHEM 997 Independent Study
   e. Scholarly Tools: Up to 9 credits of foundational classes, either from other Departments (subject to approval by the student’s advisory committee) or those listed below:

CHEM 511 Advanced Inorganic Chemistry
CHEM 512 Organometallic Chemistry
CHEM 521 Advanced Organic Chemistry II
CHEM 522  Advanced Organic Chemistry III

Theory
Select two of the following:

CHEM 475  Materials Chemistry 6
CHEM 530  Chemical Thermodynamics 3
or PHYS 541  Statistical Physics
or CHE 509  Advanced Chemical Engineering Thermodynamics

CHEM 531  Chemical Dynamics
CHEM 532  Quantum Mechanics in Chemistry 4
or PHYS 533  Quantum Mechanics

f. Six (6) credit hours of 500-level chemistry courses from two sequences other than the major. Foundational classes from other divisions may be included. Three (3) of these credits may be from other Departments.

g. Scholarly Tools: Up to nine (9) credit hours of foundational classes listed below, some of them may be stipulated by the Department.

CHEM 466  Fundamentals of Physical and Biophysical Chemistry 4
CHEM 454  Inorganic Chemistry II 3
CHEM 333  Analytical Chemistry 3
CHEM 361  Problem Solving in Organic Chemistry I 1
CHEM 362  Problem Solving in Organic Chemistry II 1
CHEM 510  Intermediate Inorganic Chemistry 3
CHEM 520  Advanced Organic Chemistry I 3

h. CHEM 599 Research 10-12 credits; some of these credits may be replaced by Scholarly Tools as described above if deemed appropriate as long as the minimum requirement is met.

i. CHEM 998 Thesis 4-6 credits.

Clinical Translational Science

M.S. in Clinical Translational Science (p. 361)

Ph.D. in Clinical Translational Science (p. 360)

Courses

PATH 500. Biochemistry and Cell Biology. 6 Credits.
Knowledge in biochemistry and cell biology form the core concepts that underlay all study and research endeavors in the clinical sciences. Since the basics in these two disciplines are paramount to a successful graduate studies program, the course is designed to emphasize proficiency in basic concepts. The course is highly didactic and makes no assumptions of previous educational experiences of the incoming graduate student. This is deemed essential for a course that forms the stem in a multi-disciplinary graduate program. Thus the course is focused on basic textbook-based foundational knowledge and problem solving skills. The course begins by relating basic general and organic chemistry to biochemical systems, followed by addressing actual biochemical, synthetic and degradation reactions, and expanding this to the macromolecular and cell biological components of the process. Thus the study is first presented with the biochemical and molecular aspects of cellular processes and then uses this to build a more comprehensive picture of how molecular structures come together to forms structures visible by various forms of microscopy.

PATH 505. Seminar in Clinical and Translational Science. 1 Credit.
All students and faculty within the program will participate in longitudinal seminars discussing their research area and interrelationships with complimentary disciplines. This may be in form of discussions, “chalk talks” of current efforts, literature or topic review. This will give students and faculty interdisciplinary and collaborative exposure to broad areas of inquiry and foster creativity and collaboration. This course will be taken annually by all students in the CTS program. Repeatable to 11 credits. S/U grading. F.S.
Doctor of Philosophy in Clinical Translational Science

Admission Requirements

The application process occurs through the School of Graduate Studies. Information is available from the UND School of Graduate Studies website (http://www.und.edu/dept/grad) (http://graduateschool.und.edu/).

If further advice or help would be beneficial to an applicant’s decision-making process, we encourage her or him to contact our Director of Graduate Education.

1. Completion of a four-year degree from an accredited university. We are particularly interested in students who have completed an undergraduate degree within the state of North Dakota.

2. Coursework: Admission into the graduate program offered through our department is dependent upon the applicant’s demonstration of effective academic skills and appropriate undergraduate training. Generally, the applicant will have completed successfully the following coursework:
   - General Biology or Zoology (one year sequence)
   - General Chemistry (one year sequence)
   - Organic Chemistry
   - College Algebra

Coursework in Physics, Molecular Biology, or Genetics is strongly recommended.

Preference for admission may be given to applicants who have completed coursework in at least one of the following areas: Biology, Cell Biology, Chemistry, Biochemistry, or Medical Laboratory Sciences.

Applicants must have a cumulative undergraduate GPA of at least 2.75 and a cumulative GPA of 3.00 in graduate level course work, if applicable. Since the Graduate School requires a 3.0 for admission, those individuals with GPA less than 3.0 would have to be admitted under provisional status.

1. Graduate Record Examination Scores: Applicants must submit Graduate Record Examination (General Test) scores. Preference for admission will be given to applicants whose test scores fall at or above the reported national averages or 50th percentiles.

2. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

3. Admission to the Clinical and Translational Science Graduate Program can be made either through the MS degree program or by application directly to the PhD degree program. A MS degree is not required for admission into the PhD degree program.

4. Students who elect to begin the MS degree program and later decide they wish to pursue the PhD degree may choose to attempt to bypass the MS degree by taking the comprehensive examination. By passing it and meeting the other requirements, such as a GPA of 3.0 or higher in graduate level coursework, a student may be admitted to the PhD program without completing the MS program. Otherwise, a student admitted to the MS program must complete the degree as listed.

Degree Requirements

The graduation requirements for the Ph.D. degree in the Clinical and Translational Sciences Program consist of required and elective coursework and research leading to the preparation of a dissertation and scholarly tools.

1. Minimum of 90 semester hours of graduate credit.

2. Completion of the following graduate level courses (90 credits):

   Foundational Coursework to be completed by all CTS graduate students:
   - BIMD 510 Basic Biomedical Statistics 2
   - BIMD 516 Responsible Conduct of Research 2
   - PATH 500 Biochemistry and Cell Biology 6
   - PATH 505 Seminar in Clinical and Translational Science 1
   - PATH 590 Readings 1-3
   - PATH 591 Special Topics 1-4
   - PATH 593 Research 1-6
   - PATH 999 Dissertation 1-15

   For the Pathogenesis of Human Disease Specilization, the following are required core courses:
   - Mbio 509 Immunology 3
   - ANAT 517 3
   - PATH 575 Molecular and Pathological Basis of Human Disease 4
   - PATH 591 Special Topics 1-4

   Students in the Pathogenesis of Human Disease Specilization are required to take a minimum of 4 hours of elective courses:

   Examples:
   - Breast Disease, 1 cr
   - Urinary Disease, 1 cr
   - Human Population Genetics, 2 cr
   - Metals, 2 cr
   - Other available, 1-4 cr

   For the Bioinformatics and Human Population Genetics Specialization, the following are required core courses:
   - MPH 531 Biostatistics 1 * 3
   - MPH 532 Biostatistics 2 3
   - MPH 534 Bioinformatics 3
   - MPH 535 Health Care Data Mining 3

   * MPH 531 Biostatistics 1 can be substitute for the required foundational course BIMD 510 Basic Biomedical Statistics.

   Students in the Bioinformatics and Human Population Genetics Specialization are required to take a minimum of 5 hours of elective courses from the following:

   - PATH 591 Special Topics 1-4
   - MPH 533 Advanced Biostatistics 3
   - PATH 590 Readings 1-3
   - PATH 591 Special Topics 1-4

1. Other graduate level courses may be selected or substituted if approved by the graduate student’s Faculty Advisory Committee. Elective courses chosen should be appropriate to the student’s area of interest.

2. Scholarly Tools: All candidates for the PhD degree must demonstrate competence in the scholarly tools for study and research in the Clinical and Translational Science Graduate Program. Each department at UND is responsible for setting up its own “Scholarly Tool” requirements. These requirements must be completed before the student is permitted to take the comprehensive examination or becomes a candidate for the PhD degree. For the CTS program BIMD 510 Basic Biomedical Statistics meets the scholarly tool requirement.

3. Research and Dissertation: The PhD degree in Clinical and Translational Sciences requires completion of a dissertation based on the results of a research project completed by the graduate student under the guidance of a faculty advisor. The project must represent an original and independent investigation by the student. It is expected that the results of the research will be published in a refereed scientific journal before graduation or at least accepted for publication. The candidate must make a significant contribution to the advancement of knowledge in the field. The dissertation prepared by the candidate must be presented and defended before the Advisory Committee and the Clinical and Translational Sciences Graduate Faculty.
Master of Science in Clinical Translational Science

Admission Requirements

The application process occurs through the School of Graduate Studies. Information is available from the UND School of Graduate Studies website (http://www.und.edu/dept/grad) (http://graduateschool.und.edu/).

If further advice or help would be beneficial to an applicant's decision-making process, we encourage her or him to contact our Director of Graduate Education.

1. Completion of a four-year degree from an accredited university. We are particularly interested in students who have completed an undergraduate degree within the state of North Dakota.

2. Coursework: Admission into the graduate program offered through our department is dependent upon the applicant's demonstration of effective academic skills and appropriate undergraduate training.

Generally, the applicant will have completed successfully the following coursework:

- General Biology or Zoology (one year sequence)
- General Chemistry (one year sequence)
- Organic Chemistry
- College Algebra

Coursework in Physics, Molecular Biology, or Genetics is strongly recommended.

Preference for admission may be given to applicants who have completed coursework in at least one of the following areas: Biology, Cell Biology, Chemistry, Biochemistry, or Medical Laboratory Sciences.

Applicants must have a cumulative undergraduate GPA of at least 2.75 and a cumulative GPA of 3.00 in graduate level course work, if applicable. Since the Graduate School requires a 3.0 for admission, those individuals with GPA less than 3.0 would have to be admitted under provisionary status.

1. Graduate Record Examination Scores: Applicants must submit Graduate Record Examination (General Test) scores. Preference for admission will be given to applicants whose test scores fall at or above the reported national averages or 50th percentiles.

2. Satisfy the School of Graduate Studies' English Language Proficiency requirements as published in the graduate catalog.

3. Admission to the Clinical and Translational Science Graduate Program can be made either through the MS degree program or by application directly to the PhD degree program. A MS degree is not required for admission into the PhD degree program.

4. Students who elect to begin the MS degree program and later decide they wish to pursue the PhD degree may choose to attempt to bypass the MS degree by taking the comprehensive examination. By passing it and meeting the other requirements, such as a GPA of 3.0 or higher in graduate level coursework, a student may be admitted to the PhD program without completing the MS program. Otherwise, a student admitted to the MS program must complete the degree as listed.

Degree Requirements

Students seeking the Master of Science degree through the Clinical and Translational Science Graduate program at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the program.

1. Minimum of 38 semester hours of graduate credit.

2. Completion of the following graduate level courses (minimum 38 credits):

Foundational Coursework to be completed by all CTS graduate students:

- BIMD 510 Basic Biomedical Statistics 2
- BIMD 516 Responsible Conduct of Research 2

-/pathway:

**Biostatistics track:**

- MPH 531 Biostatistics 1
- MPH 532 Biostatistics 2

**PhD track:**

- MPH 531 Biostatistics 1
- MPH 532 Biostatistics 2
- MPH 531 Biostatistics 1

For students in the Bioinformatics and Human Population Genetics track, a minimum of 4 hours of elective courses selected from the following:

- MPH 532 Biostatistics 2
- MPH 531 Biostatistics 1
- MPH 530 Biostatistics 2

Other graduate level courses may be selected or substituted if approved by the graduate student’s Faculty Advisory Committee.

Elective courses chosen should be appropriate to the student’s area of interest.


Communication

M.A. in Communication (p. 363)

Ph.D. in Communication (p. 362)

Courses

COMM 501. Theoretical Perspectives in Communication. 3 Credits. Course provides a conceptual and historical overview of Communication Studies, paying special attention to questions of epistemology. F.

COMM 505. Concepts in Quantitative Communication Research. 3 Credits. In the two-part 505/506 course, students focus on honing their understanding of the quantitative/qualitative paradigm in Communication research. While this course section focuses on the various methods that fall under the labels of quantitative, both portions of the course seek to identify possible points of connection and resistance across the spectrum of methodological choices and require participation in Communication Program colloquium series. F, odd years.

COMM 506. Concepts in Qualitative Communication Research. 3 Credits. In the two-part 505/506 course, students focus on honing their understanding of the qualitative paradigm in Communication research. While this course section focuses on the various methods that fall under the labels of qualitative, both portions of the course seek to identify possible points of connection and resistance across the spectrum of methodological choices and require participation in Communication Program colloquium series. F, even years.

COMM 512. Communication Ethics, Law, and Regulation. 3 Credits. Focuses on the ethical foundations of media law and communication public policy.
COMM 401. Organizational Communication. 3 Credits.
Analysis of communication behavior in formally structured relationships as it relates to the organization and to individuals. Special attention given to organizational style, status, trust and conflict-management. Informal communication networks and rumor are studied. S.

COMM 402. Intercultural/International Communication. 3 Credits. This course will provide an overview of the study of intercultural and international communication. Topics addressed will include: history, literature, and culture of specific groups including racial, religious, and ethnic issues that affect communication patterns and outcomes. S.

COMM 404. Advertising and Society. 3 Credits. Examines and evaluates the social, ethical and economic aspects of advertising. Attention is given to appraising the effects of advertising on the consumer and competition. F.

COMM 405. Social Implications of the Information Society. 3 Credits. Considers and evaluates different perspectives on the information society, ranging from humanistic and Neomarxist critiques to the optimistic scenarios of some futurists. Examines the implications of new means of creating, storing, manipulating and disseminating information. Discussion of whether or not the potential benefits will be realized. S.

Doctor of Philosophy in Communication

Admission Requirements

Admission Requirements for consideration for the Doctor of Philosophy degree in the Communication Program include:

1. Cumulative undergraduate GPA of 3.0 or higher OR MA degree in Communication
2. Statement of interest, including personal goals and the relevance of the Ph.D. in Communication to those goals.
3. Original academic paper, 10-15 pages in length, reflecting the student’s ability to articulate and synthesize ideas.
4. Three letters of recommendation from sources familiar with the applicant’s potential as a doctoral student in Communication.
5. Graduate Record Examination General Test.
6. To be considered for a teaching assistantship, the student must submit a statement of teaching philosophy and letters of recommendation must address the student’s teaching abilities.
7. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

Note: Students whose native language is not English are not permitted to hold teaching assistantships unless they have attained a score of at least 50 on the SPEAK (Speaking Proficiency English Assessment Kit) or the TSE (Test of Spoken English). The test is administered at the University, after the student arrives on campus.
Degree Requirements

Students seeking the Doctor of Philosophy degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Communication Program.

Requirements for the Doctor of Philosophy Degree set forth by the Communication Program include:

1. Completion of 90 semester credit hours beyond the baccalaureate degree. Thirty credit hours from a Master’s degree in communication or related discipline may be applied toward the 90 credit hours.
2. Core Requirements, including: (15 cr)
   - COMM 501 Theoretical Perspectives in Communication 3
   - COMM 505 Concepts in Quantitative Communication Research 3
   - COMM 506 Concepts in Qualitative Communication Research 3
   - COMM 535 Intercultural Communication 3
   - COMM 550 International and Global Communication 3
3. Elective Requirements from COMM (minimum of 21 credits chosen from the list below)
   - COMM 512 Communication Ethics, Law, and Regulation 3
   - COMM 515 International and Intercultural Narrative Communication 3
   - COMM 525 Interpersonal Relations and Communication 3
   - COMM 528 Intercultural Global Conflict 3
   - COMM 530 Communication, Society, & Diversity 3
   - COMM 533 Communication and International Development 3
   - COMM 538 International Media 3
   - COMM 540 Communication and Organizations 3
   - COMM 543 International and Intercultural Indigenous Communication 3
   - COMM 549 Information Communication Technologies 3
   - COMM 570 Seminar in Communication 3
4. Additional Electives (minimum of 15 credits chosen from the list below)
   - Interdisciplinary coursework (maximum 9 credits)
   - Remaining courses from COMM electives above
   - COMM 591 Individual Readings and Research may be taken at discretion of Committee
5. Completion of a non-thesis MA research project (9 credits; these may be taken as COMM 997 Credits)
6. Comprehensive Examination
7. Dissertation (15 cr)

Master of Arts in Communication

Admission Requirements

The Communication Graduate Faculty will recommend admission based on the following applications materials.

Master of Arts in Communication:

1. A letter of application, including a statement of purpose answering the question of why one would be interested in advanced study of communication. This letter should also include an indication of a faculty member with whom applicant might work.
2. Acceptable performance on Graduate Record Examination General Test.
3. Completion of the equivalent of 20 undergraduate credits in speech communication and/or mass communication, journalism or related field, including at least 12 upper division credits.
4. Provide a transcript with a minimum 3.0 undergraduate Grade Point Average.
5. Three letters of recommendation.
6. To be considered for a teaching assistantship, the student must submit a statement of teaching philosophy.
7. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.
8. Optional materials, including writing or work samples.

Degree Requirements

Students seeking the Master of Art degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Communication Program.

Required core courses for all Communication Master’s students:

- COMM 501 Theoretical Perspectives in Communication 3
- COMM 505 Concepts in Quantitative Communication Research 3
- COMM 506 Concepts in Qualitative Communication Research 3

Thesis Option

Students choosing the thesis option must meet the following requirements:

1. A minimum of 30 credits in communication are required if a minor or cognate is not chosen.
2. The coordinator of graduate studies appoints a three-person advisory committee from the Graduate Faculty, normally drawn from the Communication Program and chaired by the student’s adviser.
3. Candidates are administered written comprehensive examinations after the completion of 18 hours of graduate credit.
4. Thesis topics must be approved by the student’s faculty advisory committee, with research conducted under the guidance of the student’s faculty advisory committee, then completed to the satisfaction of the faculty advisory committee with a final oral examination.

Non-Thesis Option with Professional Portfolio

Students choosing the non-thesis option whose final project is a professional portfolio must meet the following requirements:

1. A minimum of 32 credits in communication are required if a minor or cognate is not chosen.
2. The coordinator of graduate studies appoints a four-person advisory committee comprised of three Graduate Faculty, normally drawn from the Communication Program and chaired by the student’s adviser, plus an external professional member to the committee who serves in an advisory capacity only.
3. Candidates will be expected to prepare a professional portfolio to be examined by their advisory committee.
4. Portfolio content must be approved by the student’s faculty advisory committee, completed under the guidance of the student’s advisory committee, with a review of the completed professional portfolio to the satisfaction of the advisory committee.

A Minor or Cognate Option

1. If a minor or cognate is approved by a student’s faculty advisory committee, the student will be required to take the same amount of credits required for a major (30 credits for the thesis option or 32 credits for the non-thesis option with professional portfolio) with a minimum of 20 credits in communication and a minimum of 9 credits in a minor or cognate.

Communication Sciences and Disorders

M.S. in Communication Sciences and Disorders (p. 365)
Courses

CSD 501. Seminar in Speech-Language Pathology and Audiology. 1-3 Credits.
A study of the application of current and emerging data in the area of clinical assessment and management of speech disorders, language disorders, or disorders of hearing, in children and adults with communication impairments. May be repeated as topics change. Prerequisite: Consent of instructor. Repeatable.

CSD 525. Introduction to Research in Speech-Language Pathology and Audiology. 3 Credits.
Research methods in Speech-Language Pathology and Audiology. Steps in research before data analysis is undertaken. Culminates in a research proposal.

CSD 530. Audiology for SLPs. 1 Credit.
Diagnosis and management of auditory disorders. Prerequisites: CSD 431 and CSD 434. F,SS.

CSD 532. Neurogenic Communication Disorders I. 3 Credits.
Study of the representation or organization of language in the human brain as determined by multidisciplinary techniques such as neuroimaging, electrical stimulation mapping, etc. Includes aphasia and communication disturbance in adults following traumatic injury to the brain, and also clinical management. Prerequisites: CSD 231 and CSD 422.

CSD 533. Investigations in Child Language. 3 Credits.
Student formulation of questions and concerns about normal and disordered child language which are studied through a search of pertinent literature and through observation and analysis of children's linguistic production. Prerequisites: CSD 343.

CSD 534. Advanced Speech Sound Disorders. 2 Credits.
Advanced knowledge of articulation and phonological disorders; skills needed to assess and treat individuals with these disorders. Emphasis on childhood apraxia, velopharyngeal disorders, cognitive disorders, hearing loss, tongue thrust, dialectal differences, dysarthrias in children, and phonemic disorders concurrent with language disorders. Prerequisites: CSD 333 or equivalent. S.

CSD 538. Stuttering Intervention. 2 Credits.
A study of the theoretical bases for and the clinical management of stuttering in children and adults.

CSD 539. Management of Phonatory Disorders. 3 Credits.

CSD 542. Neurogenic Communication Disorders II. 3 Credits.
Assessment and intervention strategies for children with traumatic brain injury, cerebral palsy, fetal alcohol syndrome and developmental apraxia. Includes evaluation for and application of augmentative and alternative communication devices.

CSD 550. Motor Speech Disorders. 2 Credits.
The study of control and damage of speech production related to neurological diseases and lesions. Includes assessment and intervention strategies for adults with motor speech disorders such as dysarthria and apraxia of speech. Prerequisites: CSD 532 and CSD 542. SS.

CSD 551. Dysphagia. 2 Credits.
The study of normal and abnormal swallowing, swallowing disorders in children and adults including assessment and intervention strategies. Prerequisites: CSD 532 and CSD 542. F.

CSD 553. Swallowing Disorders. 2 Credits.
Prerequisites: CSD 422 and CSD 542; or equivalents.

CSD 572. Neurogenic Communication Disorders IV. 3 Credits.
A study of cognitive and communication deficits that accompany right hemisphere damage, as well as traumatic brain injury, their diagnosis and management. Prerequisites: CSD 422 and CSD 532.

CSD 580. Interprofessional Health Care. 1 Credit.
The purpose of the course is to learn to work effectively in an interdisciplinary health care team, using a shared patient-centered approach. Students work with other team members from physical therapy, nursing, occupational therapy, medicine, social work, clinical lab science, and dietetics. Case studies using problem-based learning techniques are the primary teaching strategy. S/U grading.

CSD 583. Evaluation and Service Delivery. 3 Credits.
The study of: 1) the underlying principles and philosophies of evaluation in speech-language pathology, including interviewing, administering and interpreting diagnostic tests and protocols, and client counseling; and 2) the concepts and principles of service delivery including creative problem solving, decision making, collaboration, and management of services.

CSD 584. Advanced Clinical Practicum. 1-16 Credits.
Provision of clinical services to individuals with communication disorders under the supervision of an ASHA certified supervisor. Placement will be the UND Speech-Language-Hearing Clinic or a departmentally-approved external site. Prerequisites: CSD 485 and consent of instructor. Repeatable.

CSD 585. Practicum in the School Setting. 1-16 Credits.
Supervised practicum in a University-approved cooperating school. Prerequisites: Graduate standing and consent of department. Repeatable to 16 credits. F,S.

CSD 586. Advanced Clinical Practicum: Audiology. 1-16 Credits.
The administration and interpretation of tests and procedures for evaluation of human auditory functioning; practice involving interviews, case histories and client counseling.

CSD 592. Research Design in Speech and Hearing Sciences. 3 Credits.
The use of speech science instrumentation and data collection and analysis in human speech, language and hearing. Prerequisites: CSD 541 and 543.

CSD 595. Research Problems in Speech-Language Pathology-Audiology. 1-3 Credits.
A. Speech-Language Pathology, B. Audiology. Prerequisite: Consent of instructor. Repeatable.

CSD 597. Special Problems in Communication Disorders. 1-3 Credits.
An examination of special topics in communication disorders. Prerequisite: Consent of instructor. Repeatable.

CSD 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

CSD 997. Independent Study. 2 Credits.

CSD 998. Thesis. 1-9 Credits.
Repeatable to 9 credits.

CSD 999. Dissertation. 1-12 Credits.
Repeatable to 18 credits.

Undergraduate Courses for Graduate Credit

CSD 343. Language Development. 3-4 Credits.
The nature and development of linguistic content, form, and use from birth to adulthood are studied relative to the development of communication and speech; relative to cognitive, social, and physical development; and relative to cultural diversity. Prerequisites or Corequisites: ENGL 209, PSYC 250, and CSD 340; or equivalents. F.

CSD 431. Introduction to Audiology. 3 Credits.
Elementary structure and function of the hearing mechanism; basic psychophysical dimensions of the auditory mechanism; types of deficient hearing; pure tone threshold and screening audiometry. Students are required to do hearing testing to qualify for certification in speech and hearing. Prerequisites: CSD 231 and CSD 235, and MATH 103. F.

CSD 434. Aural Rehabilitation. 3 Credits.
Principles, techniques and clinical practice in the diagnosis and rehabilitation of hearing disorders in children and adults; auditory training, speech reading and hearing conservation. Prerequisites: CSD 431 and CSD 343, or consent of instructor. S.

CSD 497. Special Problems in Communication Disorders. 1-3 Credits.
An examination of special topics in Communication Disorders. Prerequisite: Consent of instructor. Repeatable. On demand.
Master of Science in Communication Sciences and Disorders

Admission Requirements

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. Graduate Record Examination—General Test.
2. Overall undergraduate GPA of at least 2.75 and a 3.00 in the courses required for an undergraduate major in Communication Sciences Disorders.
3. Admittance to approved status typically requires an undergraduate major in Communication Sciences Disorders.
4. Those admitted to Qualified Status must have at least 12 semester credits of undergraduate work in the field, but will be required to complete the coursework for the undergraduate major.
5. Criteria used in admission decisions:
   a. Scores on the Graduate Record Examination General test;
   b. All grade point averages from previous undergraduate, post-baccalaureate and graduate studies;
   c. The extent and quality of previous clinical, research, and service activities; and
   d. Quality of speaking, writing, and interpersonal skills.
6. Applicants should include documentation of their qualifications relative to the criteria above.
7. Admissions for summer and fall enrollment and the award of financial aid will be based on applications completed by January 15.
8. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

Degree Requirements

Students seeking the Master of Science degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Communication Sciences and Disorders Department.

Thesis Option:

1. A minimum of 30 semester credits in a major field, including the credits granted for the thesis and the research leading to the thesis.
2. At least one-half of the credits must be at or above the 500-level.
3. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.
4. Required CSD Courses:
   5. CSD 525 Introduction to Research in Speech-Language Pathology and Audiology 3
   6. CSD 530 Audiology for SLPs 1
   7. CSD 532 Neurogenic Communication Disorders I 3
   8. CSD 533 Investigations in Child Language 3
   9. CSD 534 Advanced Speech Sound Disorders 2
  10. CSD 536 Stuttering Intervention 2
  11. CSD 538 Management of Phonatory Disorders 3
  12. CSD 542 Neurogenic Communication Disorders II 3
  13. CSD 550 Motor Speech Disorders 2
  14. CSD 551 Dysphagia 2
  15. CSD 583 Evaluation and Service Delivery 3
  16. CSD 584 Advanced Clinical Practicum 1-16
  17. CSD 572 Neurogenic Communication Disorders IV 3

Scholarly Tools

18. EFR 515 Statistics I 3

School Practicum

19. CSD 585 Practicum in the School Setting 10

Electives

20. CSD 595 Research Problems in Speech-Language Pathology-Audiology 1-3
21. CSD 597 Special Problems in Communication Disorders 1-3

Independent Study

22. CSD 997 Independent Study 2

Total Credits 49-68

Non-Thesis Option:

1. Thirty-two (32) credits including credits required for the major.
2. A minimum of two credits of Independent Study.
3. At least one-half of the credits must be at or above the 500-level.
4. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.
5. Preparation of a written independent study approved by the faculty advisor.
7. Required CSD Courses:
   8. CSD 525 Introduction to Research in Speech-Language Pathology and Audiology 3
   9. CSD 530 Audiology for SLPs 1
   10. CSD 532 Neurogenic Communication Disorders I 3
   11. CSD 533 Investigations in Child Language 3
   12. CSD 534 Advanced Speech Sound Disorders 2
   13. CSD 536 Stuttering Intervention 2
   14. CSD 538 Management of Phonatory Disorders 3
   15. CSD 542 Neurogenic Communication Disorders II 3
   16. CSD 550 Motor Speech Disorders 2
   17. CSD 551 Dysphagia 2
   18. CSD 583 Evaluation and Service Delivery 3
   19. CSD 584 Advanced Clinical Practicum 1-16
   20. CSD 572 Neurogenic Communication Disorders IV 3

Scholarly Tools

21. EFR 515 Statistics I 3

School Practicum

22. CSD 585 Practicum in the School Setting 10

Electives

23. CSD 595 Research Problems in Speech-Language Pathology-Audiology 1-3
24. CSD 597 Special Problems in Communication Disorders 1-3

Independent Study

25. CSD 997 Independent Study 2

Total Credits 49-68

Students wishing to qualify for employment in a school setting must complete requirements for a teaching credential as a graduate student. These include School Program in CSD, and . Students must also take the Praxis I Teacher Certification Examination.

Graduate Students already having a teaching credential with some other major must take T&L 400 Methods and Materials and practicum in a school before being recommended for employment in a school.

Computer Science

M.S. in Computer Science (p. 369)
M.S. in Data Science (p. 370)
Ph.D. in Scientific Computing (p. 367)

Courses

CSCI 500. Graduate Orientation. 1 Credit. A discussion of various research and applied computing projects. Continued enrollment required of all graduate students until a research/project topic and an advisor are selected. S/U grading.
CSCI 501. Topics in Computer Science. 1-3 Credits.
Selected topics from current developments in Computer Science. Repeatable to 3 credits. Prerequisite: Permission of department. Repeatable to 3 credits.

CSCI 513. Advanced Database Systems. 3 Credits.
An advanced study of database system architecture, implementation, and applications, with emphasis on the object-oriented, object-relational, and embedded data models, and new database advancements including research and practical issues in database systems and data science. Prerequisite: CSCI 455.

CSCI 515. Data Engineering and Management. 3 Credits.
This course studies theoretical and applied research issues related to data engineering, management, and science. Topics will reflect state-of-the-art and state-of-the-practice activities in the field. The course focuses on well-defined theoretical results and empirical studies that have potential impact on data acquisition, analysis, indexing, management, mining, retrieval, and storage. Prerequisite: CSCI 513. S, even years.

CSCI 522. Theoretical Foundations of Computer Science. 3 Credits.
A selection of topics from theoretical computer science, possibly including formal languages, automata, other models of computation, and the theory of computability, decidability, and complexity. Prerequisite: CSCI 435.

CSCI 532. High Performance Computing and Paradigms. 3 Credits.
A study of current topics in threads, inter-process communication and synchronization, master-slave and peer designs for concurrency, client-server architectures, cluster/grid computing and massively parallel computer architectures. A considerable amount of programming will be done in one or more of these environments. F, odd years.

CSCI 537. Graduate Cooperative Education. 1-2 Credits.
A practical work experience in advanced computing, approved by the student's advisor. Requirements include a written report and an oral presentation upon completion of the work experience. Prerequisites: Minimum of 9 graduate credits in computer science and consent of the Department. S/U grading. On demand.

CSCI 543. Machine Learning. 3 Credits.
An introductory course in machine learning for data science. Topics include the learning algorithms of a Bayesian network, neural network, parametric/ non-parametric methods, kernel machine, support-vector machine, etc. for regression, classification, clustering, dimensionality reduction, etc. Prerequisite: CSCI 365 or CSCI 384. F, odd years.

CSCI 544. Soft Computing: Computational Intelligence I. 3 Credits.
A study of the computational intelligence with the Soft Computing paradigm. The topics include the theory and computational methods of Fuzzy Logic and system, Neural Network, Evolutionary Algorithm and other topics, whose paradigms and hybrid techniques are widely applied to data science and mining, pattern classification and clustering, information retrieval, control engineering, decision making, and optimization problem, etc. S, even years.

CSCI 545. Discrete Dynamical Systems Modeling and Simulation. 3 Credits.
A study of various modeling methods applicable to large scale distributed and parallel systems. Topics include cellular automata, grid models, and chaos theory. Prerequisite: CSCI 445.

CSCI 546. Advanced Computer Graphics. 3 Credits.
An introduction to advanced topics in computer graphics. Included are light and color theory, image processing and compression, spatial-frequency transformations, raytracing, sampling theory, and topics of current interest. Prerequisites: CSCI 466 and MATH 265. S, even years.

CSCI 547. Scientific Visualization. 3 Credits.
A study of visualization techniques useful in the analysis of engineering and scientific data. Topics include the study of physical models; methods of computational science; two- and three-dimensional data types; visual representation schemes for scalar, vector, and sensor data; isosurface and volume visualization methods. The course will also cover image processing and pattern recognition, with topics, including Fourier transforms, fractal geometry, and neural networks. Prerequisite: CSCI 466. F, even years.

CSCI 551. Security for Cloud Computing. 3 Credits.
Cloud computing schemes aim to provide users with a shared computing infrastructure. The privacy and security concerns in cloud computing are different from the security concerns present in a dedicated data center. This course focuses on these security concerns and countermeasures for a cloud environment. This course provides an overview of cloud computing and virtualization, the critical technology underpinning cloud computing, and the major threats to the operations of cloud computing. Topics may include access control, identity management, denial of service, account and service hijacking, secure APIs, malware, forensics, regulatory compliance, trustworthy computing, and secure computing. Prerequisites: CSCI 370, CSCI 451; and one of the following: CSCI 327, CSCI 427 or CSCI 555. S, odd years.

CSCI 552. Cyber Physical Systems Security. 3 Credits.
This course provides an introduction to security issues relating to various cyber-physical systems including industrial control systems and those considered critical infrastructure systems. Topics include: Industrial cyber security history and threats, hacking industrial control systems, securing industrial control systems, advanced cyber-physical systems security concepts, and privacy in cyber-physical systems. F, even years.

CSCI 554. Applications in AI/Computational Intelligence. 3 Credits.
A continuous study of the computational paradigms of Soft Computing in the field of Computational Intelligence. The topics include the applications of the various soft computing techniques in Computational Intelligence as well as more evolutionary algorithms in Swarm Intelligence. Prerequisite: CSCI 544. F, even years.

CSCI 555. Computer Networks. 3 Credits.
A study of new and developing network architectures and communication protocols. Broadband technologies will be considered including BISDN, ATM networks, and other high-speed networks. Prerequisite: CSCI 327.

CSCI 562. Formal Specification Methods. 3 Credits.
A foundational course that introduces several formal specification techniques for construction and analysis of software artifacts. Included are rigorous program development, abstract specifications of modules, and modeling of concurrent and distributed software. Prerequisites: CSCI 435 and CSCI 463.

CSCI 565. Advanced Software Engineering. 3 Credits.
A study of current topics related to the design and implementation of large software systems. Course content may vary with instructor and student interest. Potential topics include: software testing and validation, programming environments, program metrics and complexity, design methodologies, software reliability and fault tolerance. Prerequisite: CSCI 463.

CSCI 566. Software Engineering Project. 3-6 Credits.
The complete development of a useful software product, including specifications, design, documentation, coding, testing and verification. Students may work in teams. The project is supervised by the students' Independent Study Advisor. This course may not be used as an elective for the thesis option in computer science. Repeatable to 6 credits. Prerequisite: CSCI 463. Repeatable to 6 credits.

CSCI 575. Analysis of Algorithms. 3 Credits.
The time and space complexity of classical computer algorithms is analyzed. NP hard and NP complete problems are characterized and illustrated. Prerequisite: CSCI 435.

CSCI 582. Software Architecture. 3 Credits.
Software architecture is a fairly young sub-discipline within software engineering; it is aimed at shifting the designer's focus from algorithmic control structure to interactive interrelations among components. This course, among other things, will expose students to the concepts of design, design of design, principles and state-of-the-art methods and techniques in software architectures, which include the discussion of architectural patterns (or styles), domain specific architectural design, formal architectural description languages (ADLs), software connectors (simple and composite), architectural analysis, and middleware and component-based software development. Prerequisites: CSCI 463 and CSCI 435.
CSCI 588. Data Structure, Algorithms, and Software Design in C++. 3 Credits.
This course is intended for the Scientific Computing Ph.D students. The course attempts to introduce C++ via laboratory sessions. More specifically, this course tries to incorporate Data Structures and Algorithms in C++ as well as Software Design in C++. During these sessions the students are introduced to C++ concepts using a series of examples. Having examined the examples given in the session and having understood the concepts covered, the student should be able to complete open-ended problems. This course assumes no prior knowledge of C++.
CSCI 591. Directed Studies. 1-3 Credits.
An investigation of some specific area by an individual or small group of students working closely with a member of the graduate faculty. 1-3 credits in each graduate degree program. Prerequisites: Graduate standing and consent of instructor. Repeatable to 6 credits. F, S, SS.
CSCI 599. Research. 1-6 Credits.
This course is intended for Ph.D students to obtain credit for their research efforts. Repeatable to 21 credits. Repeatable to 21 credits. S/U grading.
CSCI 996. Continuing Enrollment. 1-12 Credits.
CSCI 997. Independent Study. 2 Credits.
Independent Study.
CSCI 998. Thesis. 1-9 Credits.
Thesis. Repeatable to 9 credits.
CSCI 999. Dissertation. 1-12 Credits.
Dissertation. Repeatable to 12 credits. F, S, SS.

Undergraduate Courses for Graduate Credit

CSCI 427. Cloud Computing. 3 Credits.
This is the undergraduate-level course on cloud computing models, techniques, and architectures. Cloud computing is an important computing model which enables information, software, and other shared resources to be provisioned over the network as services in an on-demand manner. This course introduces the current practices in cloud computing. Topics may include distributed computing models and technologies, Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS), Software-as-a-Service (SaaS), virtualization, performance and systems issues, capacity planning, disaster recovery, Cloud OS, federated clouds, challenges in implementing clouds, data centers, hypervisor CPU and memory management, and cloud hosted applications. S, even years.
CSCI 435. Formal Languages and Automata. 3 Credits.
A study of automata, grammars, and Turing machines as specifications for formal languages. Computation is defined in terms of deciding properties of formal languages, and the fundamental results of computability and decidability are derived. Prerequisites: CSCI 242 with a grade of C or better and minimum second semester junior standing. F.
CSCI 445. Mathematical Modeling and Simulation. 3 Credits.
A study of various mathematical applications for digital computers, including the modeling, simulation and interpretation of the solution of complex systems. Prerequisites: CSCI 161 or CSCI 170, and MATH 166 and a statistics course. F, even years.
CSCI 446. Computer Graphics I. 3 Credits.
Introduction to computer graphics. Topics include raster scan graphics, 2D and 3D representations, affine transformations, light and color, texture mapping, image processing, ray-tracing, and computer animation. Team-based weekly homework develops a 4 minute computer animation. Prerequisites: CSCI 242, CSCI 363, and MATH 166. F, odd years.
CSCI 448. Computer Graphics II. 3 Credits.
A continuation of CSCI 446, topics covered include: history of games, game taxonomies, game design theory, computer game development, physics engines and AI engines. Prerequisite: CSCI 446. S, even years.
CSCI 451. Operating Systems I. 3 Credits.
Introduction to operating system theory and fundamentals. Topics include: CPU scheduling, memory management, file systems, interprocess communication facilities, security. Weekly homework assignments focus on process synchronization using fork/exe, threads, mutexes, pipes, semaphores, and shared memory. Prerequisites: CSCI 242 and CSCI 370; both with a grade of C or better. F.
CSCI 452. Operating Systems II. 3 Credits.
A study of the implementation of operating systems and parts of operating systems, and development of system software. Prerequisites: CSCI 451. On demand.
CSCI 455. Database Management Systems. 3 Credits.
Database concepts, database design (ER, UML), database programming languages (SQL), NoSQL Database, Database Concurrency and recovery techniques, and Database security. Prerequisite: CSCI 242 with a grade of C or better. S, even years.
CSCI 457. Electronic Commerce Systems. 3 Credits.
A study of the system architecture, content design and implementation, and data analysis, management, and processing of electronic commerce. Topics include Internet basics, business issues, data management and processing, static and dynamic web programming, e-commerce content design and construction, and databases and host languages with embedded SQL. Prerequisite: CSCI 260 with course topic of Dot Net. S, odd years.
CSCI 463. Software Engineering. 3 Credits.
This course teaches software engineering principles and techniques used in the specification, design, implementation, verification and maintenance of large-scale software systems. Major software development methodologies are reviewed. As development team members, students participate in a group project involving the production or revision of a complex software product. Prerequisites: CSCI 242 and CSCI 363. S.
CSCI 465. Principles of Translation. 3 Credits.
Techniques for automatic translation of high-level languages to executable code. Prerequisites: CSCI 365 and CSCI 370. F, odd years.
CSCI 491. Seminars in Computer Science. 1 Credit.
A course for advanced students. Repeatable to 3 credits. Prerequisite: Consent of instructor. Repeatable to 3 credits. S/U grading. F, S.

Doctor of Philosophy in Scientific Computing

Admission Requirements

1. Master’s degree, normally in an engineering or science related field with an overall graduate GPA of at least 3.25 (on a 4.0 scale), or a Bachelor’s degree, normally in an engineering or science related field with an overall undergraduate GPA of at least 3.00 (on a 4.0 scale) and the Graduate Record Examination General Test.
2. Prerequisites:
   • Expertise in a high level language and a basic knowledge of data structures.
   • Basic knowledge of formal languages, automata, and computability.
   • Basic knowledge of computer architecture or operating systems.
   • Basic knowledge of calculus, statistics, and linear algebra.
3. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as listed in the Graduate Academic Information section.

The department recognizes that the prerequisite expertise identified above may be acquired in several ways. Students who do not meet all of the requirements may be admitted to qualified status with the obligation of meeting the remaining requirements early in their graduate study.

Degree Requirements

Students seeking the Doctor of Philosophy in Scientific Computing degree must satisfy all general requirements set forth by the School of Graduate Studies. In addition, they must meet the following requirements set by the Computer Science Department:

1. All students are required to obtain interdisciplinary graduate training. This requirement may be met by:
   a. Either taking two course clusters from the computational category and one course cluster from an applications category
   b. Or taking three course clusters from the computational category and conducting dissertation research in an applications category in the applicable department.
2. Course clusters must be approved by the student's Faculty Advisory Committee.

3. Students may, with approval of the Computer Science Department's Graduate Committee, design their own applications category cluster.

4. The student's Faculty Advisory Committee must include one member from the applicable applications category or dissertation research.

5. The Computer Science Department's Graduate Committee must approve the Faculty Advisory Committee membership.

6. Students who have a degree in a field other than Computer Science are not required to obtain interdisciplinary graduate training. These students are required to take three computational category course clusters. In addition, the student's Faculty Advisory Committee will comprise only from Computer Science faculty.

7. Students with approved Bachelor degree:
   a. Must complete 51-66 credit hours of coursework;
   b. Must complete eight of the core courses.

8. Students with approved Master degree:
   a. Must complete 27-39 credit hours of coursework;
   b. Must complete four of the core courses.

9. Elective courses: CSci 500 and CSci 566 may not be used as electives. Only 3 credits of CSci 591 may be used as an elective.

10. Successful completion of written Graduate Qualifying Examination (GQE). The GQE's passing cut off point will be higher than the GQE's passing for Master Students (MS) taking the same exam. The GQE will consist of questions on each of the four areas. Moreover, the PhD students are required to complete GQE's requirement within the first 4 semesters, but are strongly encouraged to complete the GQE earlier in their studies.

11. Successful completion of Graduate Comprehensive Exam (GCE).


13. Completion of CSci 999 Dissertation (12 credits maximum).

14. Final oral examination, which includes a defense of the dissertation.

<table>
<thead>
<tr>
<th>CSci Course</th>
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<tbody>
<tr>
<td>CSci 599</td>
<td>Research</td>
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<tr>
<td>CSci 999</td>
<td>Dissertation</td>
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</table>

Core courses:

- CSci 513: Advanced Database Systems
- CSci 522: Theoretical Foundations of Computer Science
- CSci 532: High Performance Computing and Paradigms
- CSci 543: Machine Learning
- CSci 551: Security for Cloud Computing
- CSci 555: Computer Networks
- CSci 565: Advanced Software Engineering
- CSci 575: Analysis of Algorithms

Core Clusters:

- Computational Clusters:
  - The computing clusters contain related courses that provide depth of knowledge in specialized computing systems or methods.

  1. Software Engineering Cluster: Software engineering combines the ideas from engineering, management, and math disciplines in order to improve our ability to build complex software systems on time and within the budget. Requires any three of the following courses:

     - CSci 463: Software Engineering
     - CSci 562: Formal Specification Methods
     - CSci 565: Advanced Software Engineering
     - CSci 582: Software Architecture

  2. Data Management Cluster: The cluster enhances a student's knowledge in data engineering and management. It includes the study of database systems, data management, data mining and data warehousing, digital libraries and information retrieval and systems. Requires the following three courses:

     - CSci 455: Database Management Systems
     - CSci 513: Advanced Database Systems
     - CSci 515: Data Engineering and Management

  3. Artificial/Computational Intelligence Cluster: The goal of this track is to provide the student with both classical and advanced topics in artificial and computational intelligence. It includes the study of problem solving methods, approximate reasoning, machine learning, decision making, data mining and other application techniques. Requires the following three courses:

     - CSci 543: Machine Learning
     - CSci 544: Soft Computing: Computational Intelligence
     - CSci 554: Applications in AI/Computational Intelligence

  4. Distributed Systems Cluster: The goal for this track is to provide the student with an understanding of the hardware technologies (hardware, network, and storage devices) required to develop a machine suitable for high performance computing. Requires the following three courses:

     - CSci 427: Cloud Computing
     - CSci 551: Security for Cloud Computing
     - CSci 555: Computer Networks

  5. High Performance Computing Cluster: The cluster provides an understanding of the system architecture (hardware, network, and storage devices) and the software technologies (MPI, PVM, and Java) required to create a system capable of high performance computing. Requires the following three courses:

     - CSci 451: Operating Systems
     - CSci 532: High Performance Computing and Paradigms
     - CSci 575: Analysis of Algorithms

  6. Graphics and Visualization Cluster: The goal of this track is for the student to master the OpenGL graphics library, to develop a working understanding of signal and image processing techniques, and to be able to apply those skills to the visualization of results generated by complex computer simulations. Requires the following three courses:

     - CSci 446: Computer Graphics I
     - CSci 448: Computer Graphics II
     - CSci 547: Scientific Visualization

  7. Modeling and Simulation Cluster: In this cluster the student will study the various techniques for developing mathematical models and software simulations to predict the behavior of complex physical phenomena. Requires the following three courses:

     - MATH 460: Mathematical Modeling
     - CSci 445: Mathematical Modeling and Simulation
     - CSci 545: Discrete Dynamical Systems Modeling and Simulation

Application Clusters

The application clusters provide exposure to specific scientific disciplines that commonly make use of scientific computing methods. In addition to the clusters listed here, other clusters may be defined by the Faculty Advisory Committee with approval of the Computer Science Department's Graduate Committee.

1. Computational Mathematics Cluster: This cluster provides an understanding of the computational methods used to solve complex mathematical problems on a digital computer. Requires three graduate level mathematics courses. Possible courses are:
Degree Requirements

Students seeking the Master of Science degree must satisfy all general requirements set forth by the School of Graduate Studies as well as specific requirements set forth by the Computer Science Department. More specifically, to obtain the MS in Computer Science, students must complete 30 hours depending on the tracks. There are two tracks:

1. Thesis track, which will be offered both online and on campus. Students in the thesis track are required to write and defend their theses.

2. Non-thesis, which will be offered only online. Students in non-thesis track are required to fully develop, implement, and present a capstone project supervised by a graduate faculty member. The presentation, which is considered as a final oral examination, must be publicly presented to the faculty. Both tracks are required to take the same number of courses. The difference between the tracks is in the project, namely, capstone and thesis. Both capstone and thesis are given the same weight.

An optional Data Science focus is available for those students who want to include someData Science exposure in their program. This focus requires that the elective courses include three Data Science related courses as indicated below.

Non-Thesis Option (30 credit hours):

1. The core of required courses (9 credits):
   - CSCI 522 Theoretical Foundations of Computer Science
   - CSCI 513 Advanced Database Systems
   - CSCI 565 Advanced Software Engineering

2. Six elective courses (18 credits). Only the following courses may count towards the electives:
   - CSCI 427 Cloud Computing (*)
   - CSCI 515 Data Engineering and Management
   - CSCI 532 High Performance Computing and Paradigms (*)
   - CSCI 543 Machine Learning (*)
   - CSCI 544 Scientific Visualization
   - CSCI 551 Security for Cloud Computing
   - CSCI 554 Applications in AI/Computational Intelligence
   - CSCI 555 Computer Networks
   - CSCI 562 Formal Specification Methods
   - CSCI 575 Analysis of Algorithms

(*) CSCI 427, CSCI 532, and CSCI 543 are required for the optional Data Science focus.

3. Capstone Project (3 credits).
   - CSCI 994

4. Presentation of the Capstone Project results (CSCI 994 Capstone Project) including an oral presentation and written report (in a format suitable for publication) to the Faculty Advisory Committee, and interested faculty and students.

Thesis Option (30 credit hours):

1. The core of required courses (9 credits):
   - CSCI 522 Theoretical Foundations of Computer Science
   - CSCI 513 Advanced Database Systems
   - CSCI 565 Advanced Software Engineering

2. Five elective courses (15 credits). Only the following courses may count towards the electives:
   - CSCI 427 Cloud Computing (*)
   - CSCI 515 Data Engineering and Management
   - CSCI 532 High Performance Computing and Paradigms (*)
   - CSCI 543 Machine Learning (*)
   - CSCI 544 Scientific Visualization
   - CSCI 551 Security for Cloud Computing
   - CSCI 554 Applications in AI/Computational Intelligence

Students who do not meet all of these prerequisites may be admitted in Qualified or Provisional status with the obligation of meeting the remaining requirements early in their graduate study.
CSCI 555 Computer Networks 3
CSCI 562 Formal Specification Methods 3
CSCI 575 Analysis of Algorithms 3

(*) CSCI 427, CSCI 532, and CSCI 543 are required for the optional Data Science focus.

5. A final oral examination, which includes a defense of the thesis to the Faculty Advisory Committee, and interested faculty and students.

Master of Science in Data Science

The Data Science MS degree is an interdisciplinary program offered by the Department of Computer Science at University of North Dakota.

Admission Requirements

1. Bachelor’s degree, normally in Computer Science.
2. Overall undergraduate GPA of at least 2.85.
3. Graduate Record Examination General Test or an undergraduate degree from a CSAB/ABET accredited degree program in Computer Science.
4. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.
5. International applicants who have received their bachelor’s or master’s degree in the United States or English-speaking Canada are not required to submit the TOEFL or IELTS.

Applicants with a background in mathematics, science, or engineering will also be considered if they are adequately prepared in the field of computer science.

Students who do not meet all of these prerequisites may be admitted in Qualified or Provisional status with the obligation of meeting the remaining requirements early in their graduate study.

Degree requirements

Students seeking the Master of Science degree DS must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Computer Science Department. More specifically, to obtain the MS in Data Science, students must complete 30 hours depending on the tracks.

There are two tracks:

1. Thesis track, which will be offered both online and on Campus. Students in thesis track are required to write and defend their thesis.
2. Non-thesis, which will be offered ONLY online. Students in non-thesis track are required to fully develop, implement, and present a capstone project supervised by a graduate faculty member. The presentation, which is considered as a final oral examination, must be publicly presented to the faculty. Both tracks are required to take the same number of courses. The difference between the tracks are in the project, namely, capstone, and thesis. Both capstone and thesis are given the same weight.

Required Core Courses - 9 credits:

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<td>Electronic Commerce Systems</td>
<td>3</td>
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<tr>
<td>CSCI 534</td>
<td>Machine Learning</td>
<td>3</td>
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<tr>
<td>CSCI 544</td>
<td>Soft Computing: Computational Intelligence I</td>
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Selected three from the following courses:

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</tr>
<tr>
<td>CSCI 532</td>
<td>High Performance Computing and Paradigms</td>
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2. Educational Foundations and Research cluster (9 credit hours):

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<thead>
<tr>
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<th>Credits</th>
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<tbody>
<tr>
<td>EFR 513</td>
<td>Large Dataset Management and Analysis</td>
<td>3</td>
</tr>
<tr>
<td>EFR 530</td>
<td>Learning Analytics</td>
<td>3</td>
</tr>
<tr>
<td>EFR 535</td>
<td>Data Analytics and Visualization with R</td>
<td>3</td>
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3. Behavioral Data Analytics cluster (9 credit hours):

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<tr>
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<th>Title</th>
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<tbody>
<tr>
<td>PSYC 540</td>
<td>Foundations of Behavioral Data Analytics</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 541</td>
<td>Advanced Univariate Statistics</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 542</td>
<td>Multivariate Statistics for Psychology</td>
<td>3</td>
</tr>
</tbody>
</table>

Counseling Psychology and Community Services

M.A. in Counseling Psychology and Community Services (p. 375)
B.S./M.A. Combined Program (p. 373)
Ph.D. in Counseling Psychology (p. 373)
Minor in Counseling Psychology and Community Services (p. 377)

Graduate Certificate in Counseling with a K-12 emphasis (http://und-public.coursesleaf.com/graduateacademicinformation/departmentalcoursesprograms/counselingpsychologyandcommunityservices/coun-cert)
Courses

COUN 501. Ethics: Counseling and Counseling Psychology. 3 Credits.
Focus will be on the Ethical Principles of Psychologists and Code of Conduct of the American Psychological Association, the Codes of Ethics and Standard of Practice of the American Counseling Association and corresponding ethics codes for subspecialties within the counseling profession. Students will learn to interpret these codes and apply them to professional practice, supervision, research and teaching situations. F.

COUN 502. Professional Issues in Counseling. 1 Credit.
An introduction to counseling practice and services in mental health, addiction, and other community agencies. Emphasizes professional issues in the field, professional development and career paths, and related topics. Corequisite: COUN 501; only for students in the Community Agencies Emphasis and Addictions Emphasis.

COUN 503. Professional Issues: Internship and Job Preparation. 1 Credit.
This course explores the characteristics of professional counselor preparation, including identity development, professional organizations, licensure and certification, career paths, specializations in the field, and continuing education. Preparation for counseling internship will also be explored. Prerequisite: COUN 502 or COUN 506. F.

COUN 505. History of Psychology. 3 Credits.
Historical development of modern psychology with an emphasis on philosophical precursors to psychology, experimental and systematic phases of early psychological thought, important issues during the growth of psychology, and current and future trends. Prerequisite: Graduate standing in Counseling or Psychology.

COUN 506. Rehabilitation Counseling: Foundations and Ethical Issues. 3 Credits.
Comprehensive introduction to the rehabilitation profession, including past, present, and future trends. Areas emphasized: profession philosophy; organizational structure; historical and legislative influence; rehabilitation process and service delivery systems; professional issues, ethical codes, and behavior.

COUN 507. Life-Span Development in Counseling. 3 Credits.
This course examines the foundations of human development across the life span, including pre-natal issues, infancy, childhood, adolescence, adulthood, and aging. Theories that address biological, neurological, and environmental issues of development will be examined. Structural theories of growth, maturation, and aging will be presented with an emphasis on strategies and interventions used by counselors to deal with developmental processes and transitions. S,SS.

COUN 510. Counseling Methods. 3 Credits.
Two training components are combined to provide an intensive practicum experience. The didactic component introduces the basic interviewing and active listening skills; a laboratory component provides practice in the practical application of those skills in simulated counselling interviews.

COUN 514. Rehabilitation Counseling: Assessment and Evaluation. 3 Credits.
An introduction to assessment and related ethical issues in rehabilitation counseling. Assessment for vocational ability and independent living will be emphasized. Theory and research will be addressed, within a primarily applied framework.

COUN 515. Methods of Research. 3 Credits.
Methods and procedures of research development, design and analysis related to counseling and behavioral science. Experience in formulating and developing an individual research project. Considers research ethics and protection of human participants.

COUN 516. Counseling Research Laboratory. 1-3 Credits.
Introduces basic procedures in analysis of counseling research data. Topics including data coding, data entry and use of statistical packages are presented in an individualized manner. Prerequisite: COUN 515. Repeatable to 3 credits. S/U grading. F, S, SS.

COUN 517. Psychological Testing. 3 Credits.
The application of principles of psychological measurement to selected instruments in the areas of intellectual functioning and aptitudes; educational and occupational achievements; career interests; and personality. Development of test interpretation skills.

COUN 518. Group Theory and Process. 3 Credits.
Addresses the principles and practices of support, task, psycho-educational and therapeutic groups with various populations in a multicultural context. Includes study of professional issues relevant to group processes. Involves participation and leading group experiences.

COUN 519. Career Counseling. 3 Credits.
An introduction to the psychology of careers and to the practice of career counseling. Career development theories, occupational classification systems, assessment instruments, and the use of occupational information for career education and life planning are included. Career counseling strategies for use with a diverse population are introduced.

COUN 520. Diagnostic and Prevention Strategies in Counseling. 3 Credits.
This course will focus on the assessment and diagnosis of individual psychiatric disorders as defined by classification systems such as the Diagnostic Statistical Manual (DSM) and the International Classification of Diseases (ICD). Understanding of defined diagnostic disorders relative to the helping context will be emphasized. Knowledge of cultural concerns associated with classification systems will be explored. Emphasis will be placed on the following: assessment strategies designed to promote healthy human functioning; prevention strategies that focus on organizational/community/social justice advocacy; and the impact of diagnostic and prevention strategies on human functioning and wellness across the life span. S.

COUN 522. School Counseling and Program Management. 3 Credits.
Theory, research, and practice of K-12 school counseling and school counseling program management. S.

COUN 526. Educational Collaboration. 3 Credits.
The course focuses on the knowledge and skills essential to the consulting/collaboration process for professional school counselors in order to effectively support student adjustment and achievement. Collaboration for school improvement, program implementation, and work with parents, educators and professionals in the community is emphasized. Prerequisite: Enrollment in School Counseling Distance Program or permission of instructor.

COUN 527. School-Based Family Counseling. 3 Credits.
The course provides an overview of relevant theoretical models, approaches and specific issues of families in order for school personnel to facilitate student adjustment and achievement. Prerequisite: Enrollment in School Counseling Distance Program or permission of instructor.

COUN 529. Dynamics of Addiction. 3 Credits.
The course emphasizes the addiction and recovery process including vulnerability factors, diagnosis and treatment, and relapse prevention of addiction disorders for individuals and families. Shared characteristics of behavioral and chemical addictions, addiction theory, research, and policy will be addressed.

COUN 530. Theories of Counseling, Personality and Development. 3 Credits.
Study and analysis of counseling interventions based on different theoretical models, emphasizing personality and human development. Course involves viewing videotapes of simulated or actual counseling sessions, role-play demonstrations, and role played practice of various theoretically based counseling interventions.

COUN 531. Psychology of Women, Gender and Development. 3 Credits.
This course presents current research and trends in development theory, particularly theories pertaining to the psychological development of women and men. Issues such as abuse, ageism, depression, eating disorders, emotional experience and expression, heterosexism, feminism, and multiculturalism will be examined as related to the practice of psychology. Learning methods include writing, music, film, group discussion and creative projects. On demand.

COUN 532. Multicultural Counseling. 3 Credits.
This course offers an introduction to counseling theories and interventions appropriate for American ethnic and non-ethnic minority clients. The values suppositions of various cultural groups will be examined. In-class group experience is included.

COUN 533. Couples And Family Counseling. 3 Credits.
Prerequisite: COUN 510 or consent of instructor.

COUN 534. Child and Adolescent Counseling. 3 Credits.
Theory, research, and practice of child and adolescent counseling. F.

COUN 540. Advanced Vocational Psychology. 3 Credits.
Advanced study of major career counseling theories, models, and methods. Prerequisites: COUN 519 or equivalent, and admission to doctoral program.
COUN 551. Research Issues in Counseling Psychology. 3 Credits.
This seminar is designed to increase students' self-efficacy and ability to examine critically research issues in Counseling Psychology and their relationship to practice. Students will further develop and demonstrate skills necessary to conduct the science of Counseling Psychology, including problem conceptualization, study design and the writing of proposals. Prerequisite: Admission to the doctoral program.

COUN 552. Counseling Psychology Professional Seminar I. 1 Credit.
An examination of the skills necessary for developing as a counseling psychologist trainee, with an emphasis on critical analysis, writing, and self-examination. Introduction to the breadth of competencies expected in counseling and professional psychology. Introduction to organizational and behavioral health consultation. Prerequisite: Admission to the doctoral program in Counseling Psychology. F.

COUN 553. Counseling Psychology Professional Seminar II. 1 Credit.
An introduction to the profession of Counseling Psychology, emphasizing the history of the specialty, the philosophical underpinnings of Counseling Psychology values, and the organizational structure of leadership in the discipline. Prerequisite: Admission to the doctoral program in Counseling Psychology.

COUN 554. Preparation for the Predoctoral Internship. 1 Credit.
A focused preparation of skills necessary for successful attainment of a predoctoral internship in Psychology. Emphasis on self-presentation and interview skills. Prerequisites: Admission to the doctoral program in Counseling Psychology or Clinical Psychology and permission of the instructor.

COUN 555. Advanced Psychometrics. 3 Credits.
This lecture/lab course allows students to become familiar with fundamental concepts of psychological measurement. The emphases of the course is on test development strategies based in classical testing theory, but also includes an introduction to item response theory. Additional purposes include gaining knowledge of APA standards of assessment and their application to the profession of Counseling Psychology and related fields. Finally, the application of psychometric theory to relevant assessment instruments and the cultural implications of these applications are addressed. Prerequisites: COUN 517 or equivalent, and admission to doctoral program. F, even years.

COUN 560. Supervision Theory and Technique. 3 Credits.
A survey and critical examination of approaches, techniques and issues in providing supervision and consultation. Includes reading of current theory and research on supervision and consultation, critical analysis of approaches to supervision, demonstrations, and role-played experiences of different supervision techniques. Prerequisite: Admission to the doctoral program in Counseling Psychology, the Master's program in Counseling, the doctoral program in Clinical Psychology or instructor permission. S.

COUN 561. Consultation Theory and Practice. 2 Credits.
This course provides an introduction to theories, models and practices of mental health and psychological consultation and collaboration. Consultant roles, for both program and case consultation, will be defined. Practices include initiating and developing a consultation relationship, developing a consultation contract, enacting the contract, and consultation process.

COUN 562. Consultation Laboratory. 1 Credit.
Under supervision by a member of the faculty, students will develop and implement a consultation project with an organization or client from the community. Prerequisite or Corequisite: COUN 561. S/U grading.

COUN 563. Advanced Application of APA Ethical Standards. 2 Credits.
This elective course is designed for students in the second or third year of doctoral study, those who have already completed some work with clients and are seeking an opportunity to think more critically about the application of ethical expectations to professional work. The course will emphasize the integration of ethical and legal standards and the implementation of such standards in case-based exercises.

COUN 564. Advanced Therapy Techniques. 3 Credits.
This elective course is designed for advanced students who are engaged in clinical practica and have completed COUN 530 (Theories of Counseling Personality and Development) or its equivalent. The course will provide focused discussion and application of various evidence-supported techniques to case material. Prerequisite: COUN 530.

COUN 565. Professional Seminars. 1-3 Credits.
Seminars are designed to present current research and supplement coursework in several areas. May be repeated up to eight credits. Repeatable to 8 credits. S/U grading.

COUN 566. Personality Assessment. 3 Credits.
Theory, research, evidence, and training in the administration, scoring, interpretation and use of personality assessment instruments. Clinical interviewing and checklists, behavioral observations and report writing skills. Issues of race, ethnicity, gender, age and disability in the use of these instruments is emphasized. A two-hour lab provides supervised practice in test administration and scoring. Prerequisites: COUN 517 or equivalent, and admission to the doctoral program or permission of instructor.

COUN 569. Cognitive Assessment. 3 Credits.
Theory, research, evidence, and training in the administration, scoring, interpretation and use of cognitive assessment instruments. Clinical interviewing and checklists, behavioral observations and report writing skills. Issues of race, ethnicity, gender, age and disability in the use of these instruments is emphasized. A two-hour lab provides supervised practice in test administration and scoring. Prerequisites: COUN 517 or equivalent, and admission to the doctoral program or permission of instructor.

COUN 570. Cognitive Assessment Measures in Special Education. 3 Credits.
The course will focus on the application of cognitive assessment measures in special education. Prerequisite or Corequisite: COUN 530. F.S.SS.

COUN 581. School Counseling Practicum. 1-4 Credits.
Introduction to counseling practice. Emphasis on development, improvement, and evaluation of counseling relationships. Interview skills in counseling practice with live supervision. Prerequisites: COUN 510 and instructor permission. Prerequisite or Corequisite: COUN 530. F.S.SS.

COUN 582. Child and Adolescent Counseling Internship. 6 Credits.
Professional practice in counseling, assessment, consultation, teaching, or research in an approved agency specializing in child and adolescent counseling. Supervision must meet criteria established by the department and the Graduate School. Department permission needed for summer enrollment. Graded SP/UP. Prerequisite: COUN 580. Repeatable to 12 credits. F.S.

COUN 583. Doctoral Practicum. 1-2 Credits.
Participation in the activities of a counseling agency or similar appropriate organization. Continued development of counseling, assessment, and consultation skills with individuals, couples, groups, organizations, and communities in a multicultural context. Participation in small group and individual supervision in case conferences. This course is graded as SP/UP. Prerequisite: Admission to doctoral program. Repeatable to 12 credits. F.S.SS.

COUN 584. Community Counseling Internship. 6 Credits.
Professional practice in counseling, assessment, consultation, teaching, or research in an approved community agency. Supervision must meet criteria established by the department and the Graduate School. Department permission needed for Summer Session enrollment. Graded SP/UP. Prerequisite: COUN 580. Repeatable to 12 credits. F.S.

COUN 585. Counseling Psychology Research Practicum. 1-3 Credits.
This course involves student participation in one of several, topical research groups conducted by faculty on an ongoing basis. Groups will design and carry out research studies, and prepare manuscripts for publication or presentation. May be repeated up to 8 credits. Repeatable to 8 credits. S/U grading.

COUN 586. Practicum in Supervision. 1-3 Credits.
Supervised experience in providing supervision to counselors-in-training. Experience may be gained in supervising beginning students in role-played labs, live supervision in practicum, individual supervision, and/or small group supervision of interns. May be repeated up to 6 credits. Prerequisite: COUN 560. Repeatable to 6 credits. S/U grading.
COUN 587. Addictions Counseling Internship. 6 Credits.
Professional practice in counseling, assessment, consultation, teaching, or research in an approved agency specializing in addictions counseling. Supervision must meet criteria established by the department and the Graduate School. Department permission needed for SS enrollment. Graded SP/UP. Prerequisite: COUN 580. Repeatable to 12 credits. F.S.

COUN 588. Rehabilitation Counseling Internship. 6 Credits.
Professional practice in counseling, assessment, consultation, teaching, or research in an approved agency specializing in rehabilitation counseling. Supervision must meet criteria established by the department and the Graduate School. Department permission needed for SS enrollment. Graded SP/UP. Prerequisite: COUN 580. Repeatable to 12 credits. F.S.

COUN 589. School Counseling Internship. 3-6 Credits.
Supervised internship in a school setting. Emphasis on observing and performing guidance and counseling methods and techniques. Knowledge and performance of the roles and duties of professional school counselors. Supervision must meet criteria established by the department and the Graduate School. Prerequisite: COUN 581. Repeatable to 12 credits. S/U grading. F.S.S.S.

COUN 590. Problems in Counseling. 1-3 Credits.
Supervised independent study or application of selected problems in the counseling field. Repeatable. S/U grading.

COUN 593. Readings in Counseling. 1-3 Credits.
Reading in selected areas of counseling. May be repeated up to six credits. Repeatable to 6 credits. S/U grading.

COUN 995. Scholarly Project. 1-2 Credits.
The scholarly project will be collaborative investigations by two or more students of a relevant topic within the Counseling profession. Before initiating the project students must obtain approval from designated faculty. Prerequisites: Enrollment in either the on-campus Counseling MA program or the School Counseling online program. Prerequisite or Corequisite: COUN 515. Repeatable to 3 credits. F.S.S.S.

COUN 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

COUN 997. Independent Study. 2 Credits.

COUN 998. Thesis. 1-9 Credits.
Repeatable to 9 credits.

COUN 999. Dissertation. 1-15 Credits.
Repeatable to 15 credits.

Bachelor of Science in Rehabilitation and Human Services/Master of Arts in Counseling

Admission Requirements
The deadline for a completed application to be received in the School of Graduate Studies is February 1. In addition to the admission requirements for the Counseling Master’s program, a completed application must include the following:

1. A plan of study must be filed which demonstrates when course requirements will be taken to meet the requirements or the major or minor in Rehabilitation and Human Services and the MA in Counseling is required as part of the application process to this Combined Degree program. Individuals who are obtaining the BS degree in RHS are not required to complete COUN 588 - Rehabilitation Counseling Internship. With this exception, all other requirements of the RHS major or minor and the Coun MA degree must be met.

2. Part I - Essential Studies Requirements
   Part II - College of EHD Requirements
   Part III - Core Curriculum for RHS Majors (except RHS 497)
   Part IV - Extra-Departmental Requirements for RHS Majors
   Part V - One 10-credit Concentration for RHS Majors

3. Minimum GPA of 3.0 in all undergraduate work.

4. Written statement of interest in Rehabilitation Counseling as a profession.

Students are granted approved admission status in the School of Graduate Studies when they have completed a total of 125 undergraduate credits with an overall GPA of 3.0 or higher. This program allows students to designate two three-credit graduate courses to count for both degrees. These courses would be COUN 514 Rehabilitation Counseling: Assessment and Evaluation and COUN 519 Career Counseling.

The B.S. degree and the minor in Rehabilitation and Human Services, along with the M.A. degree in Counseling are granted at the same time. In the event that a student does not complete the graduate degree, the B.S. degree is granted only after the completion of 120 credits, including an approved rehabilitation internship.

Degree Requirements
1. Completion of an additional 24 undergraduate credits during or after the senior year.

2. Completion of at least 60 credits of graduate course work, including:
   - COUN 502 Professional Issues in Counseling 1
   - COUN 506 Rehabilitation Counseling: Foundations and Ethical Issues 3
   - COUN 507 Life-Span Development in Counseling 3
   - COUN 510 Counseling Methods 3
   - COUN 514 Rehabilitation Counseling: Assessment and Evaluation 3
   - COUN 515 Methods of Research 3
   - COUN 518 Group Theory and Process 3
   - COUN 519 Career Counseling 3
   - COUN 520 Diagnostic and Prevention Strategies in Counseling 3
   - COUN 529 Dynamics of Addiction 3
   - COUN 530 Theories of Counseling, Personality and Development 3
   - COUN 531 Psychology of Women, Gender and Development 3
   - COUN 532 Multicultural Counseling 3
   - COUN 533 Couples And Family Counseling 3
   - COUN 534 Child and Adolescent Counseling 3
   - COUN 569 Child and Adolescent Cognitive and Personality Assessment 3
   - COUN 580 Counseling Practicum 4

3. Completion of 8 credits of COUN 588 Rehabilitation Counseling Internship.

4. Completion of COUN 995 Scholarly Project (1 cr.), COUN 997 Independent Study (2 cr.) or COUN 998 Thesis (4 cr.).

Doctor of Philosophy in Counseling Psychology

Admission Requirements
The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. Keep grade of B or higher in at least four graduate level counseling courses or equivalent, including Counseling Methods, Theories and Techniques of Counseling, Counseling Practicum and Research Methods (for post-Master’s applicants).

2. Overall GPA of 3.0.

3. Eighteen (18) semester credits of undergraduate psychology including coursework in general psychology, developmental psychology, abnormal psychology, personality theory, experimental and research methods, and statistics.

4. Graduate Record Examination—General Test, verbal, quantitative and writing.
5. Satisfy the School of Graduate Studies' English Language Proficiency requirements as published in the graduate catalog.

Students are selected on the basis of undergraduate GPA, master's degree GPA (if applicable), evaluations of pre-practicum and practicum performance when appropriate to the master's degree program, scores on the verbal, quantitative and writing subtests of the Graduate Record Examination, references, vocational training and experiences, career goals, and perceived "best fit" by the admissions committee based on the applicant's personal statement and the research and clinical interests of the faculty. Doctoral graduates from a recent three-year period have had the following average grades and scores: undergraduate GPA 3.44, master's GPA 3.88, GRE-V 538, GRE-Q 603 and GRE-W 4.97. A balance between numbers of male and female students is preferred in the program. Students from minority ethnic groups are strongly encouraged to apply.

**Degree Requirements**

Students seeking the Doctor of Philosophy degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Counseling Psychology and Community Services Department.

Below is a list of coursework required to complete a Ph.D. in Counseling Psychology (students entering with a Master's degree in Counseling Psychology and Community Services Department.

**Coursework in Discipline Specific Knowledge:**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYC 537</td>
<td>Physiology of Behavior and Psychophysiological Measurement</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 539</td>
<td>Cognitive Psychology</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 551</td>
<td>Advanced Developmental Psych</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 560</td>
<td>Advanced Social Psychology</td>
<td>3</td>
</tr>
</tbody>
</table>

**Coursework in Research Methodologies (select one of the following options):**

**Option A**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYC 541</td>
<td>Advanced Univariate Statistics</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 542</td>
<td>Multivariate Statistics for Psychology</td>
<td>3</td>
</tr>
<tr>
<td>or EFR 518</td>
<td>Multivariate Analysis</td>
<td>3</td>
</tr>
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</table>

**Option B**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EFR 516</td>
<td>Statistics II</td>
<td>3</td>
</tr>
<tr>
<td>EFR 518</td>
<td>Multivariate Analysis</td>
<td>3</td>
</tr>
<tr>
<td>or EFR 523</td>
<td>Structural Equation Modeling</td>
<td>3</td>
</tr>
</tbody>
</table>

**Option C**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYC 541</td>
<td>Advanced Univariate Statistics</td>
<td>3</td>
</tr>
<tr>
<td>EFR 510</td>
<td>Qualitative Research Methods</td>
<td>3</td>
</tr>
<tr>
<td>EFR 520</td>
<td>Advanced Qualitative Research Methods</td>
<td>3</td>
</tr>
<tr>
<td>or EFR 522</td>
<td>Mixed-Methods Research</td>
<td>3</td>
</tr>
</tbody>
</table>

**Coursework in Assessment/Diagnosis:**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>COUN 520</td>
<td>Diagnostic and Prevention Strategies in Counseling</td>
<td>3</td>
</tr>
<tr>
<td>COUN 517</td>
<td>Psychological Testing</td>
<td>3</td>
</tr>
<tr>
<td>COUN 568</td>
<td>Adult Cognitive and Personality Assessment</td>
<td>3</td>
</tr>
<tr>
<td>COUN 569</td>
<td>Child and Adolescent Cognitive and Personality Assessment</td>
<td>3</td>
</tr>
</tbody>
</table>

**Optional Child and Adolescent Emphasis:**

Students must be selected or approved by the program to complete the optional Child and Adolescent Counseling Emphasis. Related to the course requirements listed below, their dissertation topic must involve children and/or adolescents in some capacity (approved by their dissertation committee) and they must complete two practica with a child/adolescent focus.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>COUN 534</td>
<td>Child and Adolescent Counseling</td>
<td>3</td>
</tr>
<tr>
<td>COUN 569</td>
<td>Child and Adolescent Cognitive and Personality Assessment</td>
<td>3</td>
</tr>
<tr>
<td>COUN 533</td>
<td>Couples And Family Counseling</td>
<td>3</td>
</tr>
<tr>
<td>COUN 999</td>
<td>Dissertation</td>
<td>1-15</td>
</tr>
<tr>
<td>PSYC 551</td>
<td>Advanced Developmental Psych</td>
<td>3</td>
</tr>
<tr>
<td>COUN 583</td>
<td>Doctoral Practicum</td>
<td>1-2</td>
</tr>
</tbody>
</table>

**Other Program Requirements:**

A. Coursework/experiences to fulfill two Scholarly Tools;

B. Specialization Area;

C. Research Mentorship Sequence;

D. Teaching Experience;

E. Social Justice Project;

F. Professional Benchmark;

G. Accumulation of Supervised Experience in Practice Settings;

H. Behavioral Healthcare Rotation;

I. Integrated Assessment;
J. Observed Structured Clinical Examination (OSCE);
K. Successful Completion of Comprehensive Examinations;
L. Successful Defense of the Dissertation; and

M. Internship.

See the Counseling Psychology Ph.D. handbook for more details.

Cognate in Counseling Psychology and Community Services
A cognate in PCPS, consisting of a minimum of nine semester credits of counseling coursework, may be taken by master's or doctoral students in related fields. Cognate coursework should be planned in consultation with a member of the department faculty. Cognates will not include practicum or internship; students interested in these experiences should consider a formal minor in Counseling (below).

Program Evaluation of Students
The PCPS faculty conduct periodic reviews of students' progress in the MA and PhD programs, including their academic performance, counseling and psychoeducational skills, professionalism, and ethics. An interview may be required as part of the review. Deficits identified through faculty review may result in either a requirement that the student engage in remedial work or the removal of the student from the program.

As noted in Standard 7.04 of the 2017 Ethics Code of the American Psychological Association, students may need to disclose personal information if that information is necessary to evaluate or obtain assistance for students whose personal problems could reasonably be judged to be preventing them from performing their training or professionally related activities in a competent manner or posing a threat to the students or others.

The practice of counseling requires significant self-disclosure for the person receiving counseling. PCPS students must become very familiar with this process. Therefore, it is an essential training component of the PCPS programs to provide assignments and classroom experiences that call for student self-disclosure of a personal nature, in an atmosphere of respect and confidentiality, to an extent not expected in other academic disciplines. The nature or extent of expected self-disclosure is specified in each course syllabus.

Master of Arts in Counseling Psychology and Community Services

Admission Requirements
On-Campus M.A. Emphasis
The applicant must meet the School of Graduate Studies' current minimum general admission requirements as published in the graduate catalog.

1. A four-year bachelor's degree from a recognized college or university (or be in a combined program).
2. Twenty semester credits of coursework in the behavioral sciences at the undergraduate level, which must include theories of personality, abnormal psychology, developmental psychology, and statistics. Additional courses in psychology and sociology may be applied toward this prerequisite. Courses in other social science disciplines where the focus is on the description or explanation of individual or group behavior may be accepted in fulfillment of this prerequisite at the discretion of the department. Applicants must submit this information on the "Supplemental Application Form and Undergraduate Coursework Summary."
3. A cumulative Grade Point Average (GPA) of at least 2.75 for all undergraduate work or a GPA of at least 3.0 for the junior and senior years of undergraduate work (based on A= 4.00).
4. Satisfactory performance on the Graduate Record Exam General Test or the Miller Analogies Test.
5. Favorable recommendations and the admission committee's perception of the "best fit" based on the applicant's personal statement.
6. Satisfy the School of Graduate Studies' English Language Proficiency requirements as published in the graduate catalog.

On-Campus M.A. Degree Requirements
Students seeking the Master of Arts degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Counseling Psychology and Community Services programs.

Thesis Option:
1. A minimum of sixty (60) semester credits, including the credits granted for the thesis and the research leading to the Thesis.
2. At least one-half of the credits must be at or above the 500-level.
3. A maximum of one-fourth (15 semester credits) of the credit hours required for the degree may be transferred from another institution.
4. Preparation of a written thesis approved by the faculty advisor and Thesis committee.
5. Comprehensive final examination.
6. Required Core and Emphasis courses.

Non-Thesis Option:
1. A minimum of sixty (60) semester credits, including at least two credits of Independent Study or Scholarly Project.
2. At least one-half of the credits must be at or above the 500-level.
3. A maximum of one-fourth (15 semester credits) of the credit hours required for the degree may be transferred from another institution.
4. Preparation of a written independent study or scholarly project approved by the faculty advisor.
5. Comprehensive final examination.
6. Required Core and Emphasis courses.

Required Core Courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COUN 502</td>
<td>Professional Issues in Counseling</td>
<td>1</td>
</tr>
<tr>
<td>COUN 507</td>
<td>Life-Span Development in Counseling</td>
<td>3</td>
</tr>
<tr>
<td>COUN 510</td>
<td>Counseling Methods</td>
<td>3</td>
</tr>
<tr>
<td>COUN 515</td>
<td>Methods of Research</td>
<td>3</td>
</tr>
<tr>
<td>or EFR 509</td>
<td>Introduction to Applied Educational Research</td>
<td></td>
</tr>
<tr>
<td>COUN 518</td>
<td>Group Theory and Process</td>
<td>3</td>
</tr>
<tr>
<td>COUN 519</td>
<td>Career Counseling</td>
<td>3</td>
</tr>
<tr>
<td>COUN 520</td>
<td>Diagnostic and Prevention Strategies in Counseling</td>
<td>3</td>
</tr>
<tr>
<td>COUN 529</td>
<td>Dynamics of Addiction</td>
<td>3</td>
</tr>
<tr>
<td>COUN 530</td>
<td>Theories of Counseling, Personality and Development</td>
<td>3</td>
</tr>
<tr>
<td>COUN 532</td>
<td>Multicultural Counseling</td>
<td>3</td>
</tr>
<tr>
<td>COUN 533</td>
<td>Couples And Family Counseling</td>
<td>3</td>
</tr>
<tr>
<td>COUN 534</td>
<td>Child and Adolescent Counseling</td>
<td>3</td>
</tr>
<tr>
<td>COUN 580</td>
<td>Counseling Practicum</td>
<td>4</td>
</tr>
<tr>
<td>COUN 995</td>
<td>Scholarly Project (or COUN 997 or COUN 998 with special permission)</td>
<td>2-4</td>
</tr>
<tr>
<td>or COUN 997</td>
<td>Independent Study</td>
<td></td>
</tr>
<tr>
<td>or COUN 998</td>
<td>Thesis</td>
<td></td>
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</table>

Total Credits: 40-42

Plus One of the Following Emphasis Areas:

Addiction Counseling Emphasis

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COUN 501</td>
<td>Ethics: Counseling and Counseling Psychology</td>
<td>3</td>
</tr>
<tr>
<td>COUN 517</td>
<td>Psychological Testing</td>
<td>3</td>
</tr>
<tr>
<td>COUN 587</td>
<td>Addictions Counseling Internship (2 semesters; 6 credits/semester)</td>
<td>12</td>
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</tbody>
</table>

Electives (i.e.)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COUN 505</td>
<td>History of Psychology</td>
<td>2-6</td>
</tr>
<tr>
<td>COUN 560</td>
<td>Supervision and Consultation Theory and Practice</td>
<td></td>
</tr>
</tbody>
</table>
COUN 565 Professional Seminars
COUN 585 Counseling Psychology Research Practicum

Community Mental Health Counseling Emphasis
COUN 501 Ethics: Counseling and Counseling Psychology 3
COUN 517 Psychological Testing 3
COUN 584 Community Counseling Internship (2 semesters; 6 credits/semester) 12
Electives (i.e.) 2-6
COUN 505 History of Psychology
COUN 560 Supervision and Consultation Theory and Practice
COUN 565 Professional Seminars
COUN 585 Counseling Psychology Research Practicum

Rehabilitation Counseling Emphasis
COUN 506 Rehabilitation Counseling: Foundations and Ethical Issues 3
COUN 514 Rehabilitation Counseling: Assessment and Evaluation 3
COUN 588 Rehabilitation Counseling Internship (2 semesters; 6 credits/semester) 12
Electives (i.e.) 2-6
COUN 505 History of Psychology
COUN 560 Supervision and Consultation Theory and Practice
COUN 565 Professional Seminars
COUN 585 Counseling Psychology Research Practicum

Child and Adolescent Counseling Emphasis
COUN 501 Ethics: Counseling and Counseling Psychology 3
COUN 517 Psychological Testing 3
COUN 582 Child and Adolescent Counseling Internship (New Course Request) (2 semesters; 6 credits/semester) 12
Electives (i.e.)
COUN 505 History of Psychology
COUN 560 Supervision and Consultation Theory and Practice
COUN 565 Professional Seminars
COUN 585 Counseling Psychology Research Practicum

Total Credits
Core + Elective courses 60
* program prerequisite PFT 410 Drugs Subject to Abuse or equivalent
** program prerequisite RHS 350 Overview of Disabilities or equivalent

After successfully completing practicum, students will enroll in an Internship in COUN 582 Child and Adolescent Counseling Internship, COUN 584 Community Counseling Internship, COUN 587 Addictions Counseling Internship or COUN 588 Rehabilitation Counseling Internship, depending on program emphasis, which is a two-semester supervised counseling experience at an external site. Internship will typically be completed during the second year in the program for full-time students. Internship assignments are individually arranged and administered by the program’s Internship Coordinator.

In addition to this practitioner course sequence, students are required to complete a series of research training experiences, culminating in the completion of COUN 597 Independent Study or COUN 995 Scholarly Project an independent research project conducted under the direction of the student’s advisor. Students are encouraged to begin considering and planning their research project early in their program.

After completing the majority of coursework for the degree and advancing to candidacy, students are eligible to sit for the Master’s Comprehensive Examination, which is offered once each fall and spring semester. A passing score on the examination is required for graduation.

School Counseling Emphasis - Online

A Master of Arts in Counseling, with a school counseling emphasis is offered via a synchronous online program. The School Counseling emphasis prepares students to be culturally responsive professional school counselors who promote the academic, career, personal, and social development of K-12 students while being collaborative social justice leaders in their school communities. Completion of coursework prepares students to be credentialed from the North Dakota Department of Public Instruction as a School Counselor and is compatible with licensure or credentialing requirements in other states. Program graduates are also eligible to pursue the Licensed Professional Counselor credential in North Dakota, as well as other states.

Through online courses, practical experiences, and two four day on-campus visits for two consecutive summers, students are prepared to practice as culturally responsive and social justice oriented professional school counselors in elementary schools, middle schools, and high schools. Students receive a broad, theoretical foundation in counseling, plus hands-on experiences. Social justice, advocacy, and culturally responsive training and practices are integrated throughout the curriculum.

Online M.A. Degree Admission Requirements

In order to be considered for admission to the K-12 School Counseling Emphasis you will need the following:

1. A Bachelor's degree (or higher) from a regionally accredited institution.
2. Completion of at least 20 semester credits of coursework in the behavioral sciences at the undergraduate level. These 20 credits must include the following prerequisites: Statistics, Educational Psychology, Instructional Methods, and Classroom Management. Applicants who have not completed these courses upon application can be provisionally admitted to the program, and then have one year to complete these requirements.
3. An overall grade point average (based on 4.00 scale) of 2.75 or higher in an undergraduate degree program or at least 3.00 for the last two years of undergraduate work.
4. Completion of the School Counseling Supplemental Application Form (part of the My GradSpace (http://graduateschool.und.edu/my-gradspace.cfm) application).
5. Submission of a two-page personal statement outlining your goals and objectives for seeking the graduate degree in Counseling (K - 12 School Counseling Emphasis), including your academic or professional accomplishments as well as your career goals. Additionally, clearly identify the roles of a school counselor and how your experiences and interests relate to this role.
6. Submission of three letters of recommendation from those who can comment on your academic abilities.
7. Submission of a professional resume.
8. An online interview (via web-conferencing) with program faculty. This is required for all students who are being considered for admission.

Online M.A. Degree Requirements

- Students may enroll in the school counseling practicum after satisfactory completion at least ten credits in the program. After successfully completing practicum, students will enroll in Internship in School Counseling which is a two-semester 600-hour (12 credit) supervised counseling experience at elementary and/or secondary school sites near where you live. Internship will typically be completed during the final semesters of the program. Internship placements are individually arranged in collaboration with the M.A. Counseling (K - 12 School Counseling Emphasis) Coordinator.
- In addition to the professional school counseling course sequence, students are required to complete a series of research training experiences, culminating in the completion of a scholarly project conducted under the direction of the student’s advisor. Students are encouraged to begin considering and planning their scholarly project early in their program.

After completing the majority of coursework for the degree and advancing to candidacy, students are eligible to sit for the Master’s Comprehensive Examination during their final spring semester. A passing score on the examination is required for graduation.

Courses

COUN 501 Ethics: Counseling and Counseling Psychology 3
COUN 507 Life-Span Development in Counseling 3
COUN 510 Counseling Methods 3
COUN 515 Methods of Research 3
COUN 516 Counseling Research Laboratory 3
COUN 517 Psychological Testing 3
COUN 518 Group Theory and Process 3
CJ 520. Topics in Research Methods. 3 Credits.
An examination of philosophical underpinnings of the scientific method in social research. The course examines epistemological and ontological debates in contemporary social research and their application to research design. Repeatable.

CJ 522. Qualitative Research Methods in Criminal Justice. 3 Credits.
An examination of the underlying rationale, methods, and limitations of qualitative research in criminal justice. Topics include ethnographic research, action research, historical research, case studies, and content analysis.

CJ 525. Advanced Quantitative Methods/Analysis. 3 Credits.
This course is intended to familiarize students with advanced multivariate statistical techniques. Topics include regression analysis, factor analysis and path analysis. Other specific statistical analysis techniques may also be explored. Prerequisite: SOC 521 or consent of the instructor.

CJ 526. Special Topics in Quantitative Analysis. 3 Credits.
Variable topics exploring advanced statistical methods/analytical techniques such as time-series analysis, structural equation models, logistics regression, hierarchical linear modeling, categorical-data analysis and general linear models. Topics to be determined based on student demand. Prerequisite: CJ 525 or consent of instructor. Repeatable.

CJ 535. Seminar in Juvenile Justice. 3 Credits.
Variable topics addressing the administration of the juvenile justice system and juvenile justice policy. Course will consist of lectures, discussion, and readings. Repeatable to 9 credits. Prerequisite: Admission into Criminal Justice PhD program. Repeatable to 9 credits.

CJ 540. Seminar in Criminal Justice Policy. 3 Credits.
Variable topics addressing policy and policy development in the criminal justice system, including police, prosecution, courts, and corrections systems. Course will consist of lectures, discussion and readings. Repeatable to 9 credits. Prerequisite: Admission into Criminal Justice PhD program. Repeatable to 9 credits.

CJ 545. Seminar in Rural Justice Issues. 3 Credits.
Variable topics addressing issues in the administration of policing, prosecution, courts, and corrections in rural areas, course will consist of lectures, discussion and readings. Repeatable to 9 credits. Prerequisite: Admission into Criminal Justice PhD program. Repeatable to 9 credits.

CJ 555. Seminar in Tribal Justice Systems. 3 Credits.
Variable topics addressing the administration of criminal justice in Indian territory. Course will consist of lectures, discussion and readings. Repeatable to 9 credits. Prerequisite: Admission into Criminal Justice PhD program and IS 420. Repeatable to 9 credits.

CJ 565. Victimization. 3 Credits.
This course provides an analysis of the literature and research concerning criminal victimization. Attention will be directed toward current trends concerning the victim in the American criminal justice system with particular emphasis on measuring victimization, the impact of victimization and victim's rights and compensation initiatives. Prerequisite: Admission into Criminal Justice PhD.

CJ 594. Practicum: Research. 1-6 Credits.
This course is intended to place advanced students in criminal justice agencies as research analysts. Students will be under the supervision of a program faculty member and are expected to carry out research at the direction of an agency director or designee. Prerequisites: CJ 621 and consent of instructor. S/U grading.

CJ 597. Administrative Internship. 1-6 Credits.
Students are employed on a full-time or part-time basis in on-the-job assignments related to the administration of criminal justice agencies of federal, state or local governments. Students are required to produce an analytical report based on internship responsibilities. Prerequisite: Admission into Criminal Justice PhD program or consent of instructor. S/U grading.

CJ 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

CJ 999. Dissertation. 1-12 Credits.
Original research project suitable for publication. Repeatable to 18 credits. Prerequisites: Successful completion of comprehensive exams and consent of department. Repeatable to 18 credits.
Doctor of Philosophy in Criminal Justice Studies

Admission Requirements

In addition to the admission requirements of the School of Graduate Studies, the following requirements must be met by all applicants with the exception of those applying under the J.D./Ph.D. specialization:

1. A master’s degree in criminal justice or a related field.
2. A cumulative G.P.A. of at least 3.0 for all coursework taken for graduate credit.
3. Achieve a minimum combined score of 300 on the verbal and quantitative components of the revised Graduate Record Exam (GRE), or a minimum combined score of 1,000 on earlier versions of the GRE.
4. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

Combined J.D./Ph.D Option: Students currently enrolled in an ABA accredited law school or individuals with a Juris Doctorate (J.D.) from an ABA accredited law school may be eligible for admission to the Ph.D. program in criminal justice. Interested individuals should contact the graduate program director for details.

Degree Requirements

Students seeking the Doctor of Philosophy degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Department of Criminal Justice.

1. Complete a minimum of 60 credit hours beyond the master’s degree.
2. Complete 9 semester hours of criminological theory and 15 semester hours of doctoral level research methods/analysis.
3. Complete an additional 18 credit hours of electives of which:
   a. A minimum of 9 elective credits must be taken in criminal justice courses from the approved lists and not previously taken for graduate credit and,
   b. Up to 9 elective credits, not previously taken for graduate credit, may be selected from any courses approved by the student’s advisory committee and offered for graduate credit at either the University of North Dakota or Minot State University.
4. Complete comprehensive examination in criminological theory and research methods/analysis prior to submission and approval of the dissertation prospectus.
5. Complete an examination in one area of specialization (to be determined in consultation with the student’s advisory committee).
7. Successfully defend a dissertation.

Required Curriculum:

**Theory**

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<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CJ 510</td>
<td>Historical Perspectives in Criminology (UND)</td>
<td>3</td>
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<tr>
<td>CJ 511</td>
<td>Contemporary Perspectives in Criminology (UND)</td>
<td>3</td>
</tr>
<tr>
<td>CJ 515</td>
<td>Human Nature and Crime (UND)</td>
<td>3</td>
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**Methods**

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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CJ 520</td>
<td>Topics in Research Methods (UND)</td>
<td>3</td>
</tr>
<tr>
<td>CJ 522</td>
<td>Qualitative Research Methods in Criminal Justice (UND)</td>
<td>3</td>
</tr>
<tr>
<td>CJ 525</td>
<td>Advanced Quantitative Methods/Analysis (UND)</td>
<td>3</td>
</tr>
<tr>
<td>CJ 526</td>
<td>Special Topics in Quantitative Analysis (UND)</td>
<td>3</td>
</tr>
<tr>
<td>CJ 690</td>
<td>(MiSU)</td>
<td>3</td>
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**Electives (18 Credits, 9 of which must be from the following list)**

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<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>CJ 535</td>
<td>Seminar in Juvenile Justice (UND)</td>
<td>3</td>
</tr>
<tr>
<td>or CJ 635</td>
<td>(MiSU)</td>
<td>3</td>
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<tr>
<td>CJ 540</td>
<td>Seminar in Criminal Justice Policy (UND)</td>
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<td>or CJ 640</td>
<td>(MiSU)</td>
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<td>or CJ 645</td>
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<tr>
<td>or CJ 654</td>
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**Notes:**

- In consultation with the student’s Advisory Committee, up to nine elective credits, not previously taken during studies leading to an M.A. or M.S. degree, may be selected from any courses approved for graduate credit at either the University of North Dakota or Minot State University.

J.D./PH.D. Specialization

Option 1: Students who have successfully completed all requirements from an ABA accredited law school and have been awarded a Juris Doctorate (J.D.) degree may complete the Ph.D. in Criminal Justice through meeting the Theory and Methods/Statistics requirements of the doctoral program, successfully passing the comprehensive examination, and successfully defending a dissertation.

Option 2: Students currently enrolled in an ABA accredited law school may also complete requirements for the J.D./Ph.D. option. These students must successfully complete the Theory and Methods/Statistics components of the doctoral program, the comprehensive examination, and defend a dissertation. Students on this track must receive their J.D. prior to or coincident with receipt of their Ph.D.

Earth System Science and Policy

**M.S. in Earth System Science and Policy (p. 381)**

Master of Environmental Management (M.E.M) (p. 380)

**Ph.D. in Earth System Science and Policy (p. 380)**

**Courses**

**ESSP 501. Earth System Science and Policy I. 5 Credits.**

An overview of the fundamental issues from five research areas: Biodiversity and Ecosystem Functioning; Climate and Environmental Change; Land and Resource Management; Environmental Policy, Management, and Communication; and Human Health and the Environment. Material will be presented "situationally" in a problem-based learning environment. ESSP faculty and guest lecturers will present background information relevant to the topics. Students are expected to engage actively in the learning process by 1) determining what further information they need to understand the problem, 2) researching the questions, 3) clearly and concisely presenting the findings of their research to one another. Prerequisites: Graduate standing in ESSP. Corequisites: ESSP 501R and ESSP 501L.

**ESSP 501L. Earth System Science and Policy Laboratory I. 2 Credits.**

Laboratory session. Will require one or more full day field trips; may require one or more weekend field trips. Prerequisites: Graduate standing in ESSP. Corequisites: ESSP 501 and ESSP 501R. S/U grading.

**ESSP 501R. Earth System Science and Policy Recitation. 3 Credits.**

Small group discussions to include many parties to an environmental issue. Prerequisites: Graduate standing in ESSP. Corequisites: ESSP 501 and ESSP 501L. S/U grading.
ESSP 502. Earth System Science and Policy II. 5 Credits.
Course follows the design of ESSP 501 but with more emphasis on written reports and team projects. At the beginning of the semester, students will either select or be assigned a topic for an interdisciplinary team project for completion by the end of the semester. The team project helps students acquire an interdisciplinary outlook, and fosters communication and cooperation within a positive multi-disciplinary work environment. This will provide students with skills that are integral to the management of complex environmental problems they will face in the world beyond academia. Prerequisites: ESSP 501, 501R and 501L. Corequisites: ESSP 502R and ESSP 502L.

ESSP 502L. Earth System Science and Policy Laboratory II. 2 Credits.

ESSP 502R. Earth System Science and Policy Recitation II. 3 Credits.

ESSP 503. Environmental Policy & Science. 3 Credits.
Human interactions with the Earth system are often managed through policy and science. This course will introduce students to concepts, ideas, practices, and challenges at the nexus of policy, science, and the environment. Students will examine the human dimensions of environmental problems and the different roles of policy and science in helping us address them. F.

ESSP 504. The Biosphere. 3 Credits.
The Biosphere (ESSP 504) introduces students to the concept of the biosphere as articulated by Vladimir Vernadsky in the 1920s and 1930s, and examines the concepts and roles of nutrient cycling, biodiversity, evolution, ecology, and ecosystem productivity on Earth. The overall course is framed around the Drake equation and walks students through critical steps in the formation of the solar system, habitable zones around stars, evolution and proliferation of life on Earth, the interconnected nature of inorganic nutrient cycling and ecosystem function, and human's impact on all these systems, culminating with the final variable of the Drake equation—the longevity of civilizations—and humanity's active role in the Anthropocene. F.

ESSP 505. Energy Issues and Earth Systems. 3 Credits.
This course is about contemporary complex energy issues. It gives an overview of energy history, the last century trends and the achievement in energy production. It also discusses energy systems and energy "linkages" with society. It then examines the pros and the cons of both fossil fuels and alternative fuels. Finally it considers the future of energy in low-carbon energy systems. F.

ESSP 506. Ecosystem Services: Valuing Nature in a Market Society. 3 Credits.
Analyzes the services and goods provided by natural and human-made ecosystems with a primary focus on the agroecosystems and grasslands of the northern Great Plains. Explores the scientific framework of ecosystem services, their disruption or disturbance, economic and ecological values, methods of analyzing these values, and policy implications. S.

ESSP 507. Earth Systems Processes and Vulnerability Analysis. 3 Credits.
Earth Systems Processes and Vulnerability Analysis (ESSP 507) will explore how humans exist on an active landscape. The course focuses on an understanding of the integration of the processes of physical Earth systems and the human vulnerability to hazards and Earth system syndromes related to these processes. The course also explores human vulnerability by analyzing spatial, numerical, and historical data, through spatial and statistical techniques. S.

ESSP 508. Hydrological Cycle in Earth Systems. 3 Credits.
Hydrological Cycle in Earth Systems (ESSP 508) will introduce the processes of the hydrological cycle in the Earth system. The course focuses on an understanding of fundamental chemical and physical properties of water and processes of water movement within the Earth system through physical, biological and human controls. The course also aims to help students develop an understanding of how the hydrological cycle interacts and affects the energy balance and biogeochemical cycle in the Earth system. S.

ESSP 520. Earth Systems Modeling. 3 Credits.
Introduction to statistical and deterministic approaches for modeling earth systems, including use of modeling to support management and policymaking. Develops systems thinking skills and emphasizes modeling as a framework for environmental analysis and problem solving. Students will learn how different classes and scales of models are used to explore different type of environmental questions. Emphasis will be on the dynamic, interdependent and interactive relationships between human activities and ecosystem function and structure as well as the effects of these activities on biogeochemical cycles, energy flow, and biodiversity. Students will use these analyses to evaluate opportunities to shift toward more sustainable human behavior. Prerequisite: Graduate standing in ESSP or consent of instructor.

ESSP 530. Principles of Environmental Science. 3 Credits.
Provides a basis for understanding the complex responses of plants and animals to environmental change and presents clear explanations and analysis of interactions between organisms and their physical environment. Students will learn the physical principles that explain key Earth system processes, such as water cycle and energy cycle, and key interactions, such as radiative forcing. More importantly, students will learn principles that apply in conducting research and in the interpretation of measurements. Even though this graduate level course is intended for students who are expected to conduct research toward their degree, non-thesis graduate students are also encouraged to enroll as it covers a wide range of physical topics associated with Earth System Science. Prerequisites or Corequisites: Statistics, Calculus, College Physics, and permission of the instructor.

ESSP 540. Advanced Topics in Geospatial Technologies. 3 Credits.
The course's intent is to stay abreast of technological developments in a rapidly evolving field. Course contents will vary according to where the advances have the most immediate impact. The goal is to provide students exposure and hands-on experience needed to apply technologies to significant Earth System problems. Among technologies to be discussed are sensors for satellites and aircraft, data acquisition and image processing tools, verification and validation techniques, precision navigation by Global Positioning Satellites, and advanced uses of Geographic Information Systems. Prerequisite: Consent of instructor.

ESSP 550. Communicating Environmental Information. 3 Credits.
The focus of this class is on communication of scientific information to non-science audiences. Students will 1) probe the role of communication in the public perceptions of environmental issues, 2) examine the effectiveness of different tools in raising environmental awareness, 3) explore the barriers that hinder effective communication and subsequent motivation to action, and 4) profile a variety of environmental outreach activities. Ways to convert polarization among differing parties into consensus by communicating accurate, timely information will be explored. Prerequisite: Consent of instructor.

ESSP 590. Colloquium Series. 1 Credit.
Speaker series and student led discussions on interdisciplinary topics and research related to the graduate core courses in ESSP. Prerequisite: Consent of Instructor. S/U grading. F,S.

ESSP 594. Directed Study. 1-5 Credits.
Directed reading or investigations tailored to the needs of individual students for advanced working knowledge in specific areas. Typically requires weekly meetings with the assigned faculty member. Usually culminates in a paper on the specific topical area. Doctoral candidates may repeat once. Prerequisite: Permission of an ESSP faculty member who agrees to serve as supervisor. Repeatable to 10 credits.

ESSP 596. Doctoral Research. 1-9 Credits.
Arranged with student's advisory committee. May be repeated for credit. Prerequisite: Graduate standing in ESSP or consent of instructor. Repeatable. S/U grading. F,S,SS.
ESSP 599. Special Topics. 1-6 Credits. 
Topics of current interest. May be provided by program or visiting ESSP faculty. May be repeated for credit. Prerequisite: Graduate standing in ESSP or consent of instructor. Repeatable.

ESSP 996. Continuing Enrollment. 1-12 Credits. 
Repeatable. S/U grading.

ESSP 997. Independent Study. 2 Credits. 
Independent study and preparation of written and oral reports describing internships. Prerequisite: Approval by student's advisor of written proposal describing internship to be completed.

ESSP 998. Thesis. 3-9 Credits. 
Academic credit for thesis research that has been approved in advance by a student's advisory committee. May be repeated, but no more than 9 credits will be allowed in a master's degree program. Prerequisite: Graduate standing in ESSP or consent of instructor. Repeatable to 9 credits.

ESSP 999. Dissertation. 3-18 Credits. 
Academic credit for doctoral dissertation research that has been approved in advance by the student's advisory committee. May be repeated but no more than 18 credits will be allowed in the degree program. Prerequisite: Consent of instructor. Repeatable to 18 credits.

Master of Environmental Management

Admission Requirements

Applicants who are seeking admission to School of Graduate Studies must meet all of the minimum general education requirements identified in the graduate catalog. In addition, students must fulfill the requirements below for admission to Earth System Science and Policy Ph.D. degree program.

1. Hold a Master’s degree from a recognized college or university.
2. Have satisfactorily completed a minimum of college-level algebra plus 3 credits of college statistics or calculus, AND a minimum of 12 semester credit hours in natural or physical sciences, e.g., physics, chemistry, geosciences, biology or related sciences, AND 6 semester credits in social sciences, e.g., economics, geography, environmental studies, sociology, psychology, anthropology, archeology, political science or related fields.
3. Have earned a minimum average GPA of 3.50 on a 4.00 scale on all graduate-level coursework.
4. Submit score for the Graduate Record Examination (GRE) General Test.
5. Satisfy the School of Graduate Studies' English Language Proficiency requirements as published in the graduate catalog.

Degree Requirements

Students seeking the Doctorate degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Earth System Science and Policy Department.

The overarching goal of all the degree programs offered in Earth System Science and Policy is to facilitate the acquisition of skills required to solve environmental problems or to seize opportunities presented by a changing environment. Much of the responsibility for learning rests upon the student.

1. Students enrolled in the PhD program will take (in most cases) the following sequences. Students will complete the basic two-semester core sequence of courses during their first year of study.
   
   ESSP 503 Environmental Policy & Science 3
   ESSP 504 The Biosphere 3
   ESSP 505 Energy Issues and Earth Systems 3
   ESSP 506 Ecosystem Services: Valuing Nature in a Market Society 3
   ESSP 507 Earth Systems Processes and Vulnerability Analysis 3
   ESSP 508 Hydrological Cycle in Earth Systems 3
   ESSP 590 Colloquium Series 2

2. A minimum of 90 credits (30 of which must be taken in the Earth System Science and Policy Program) beyond the baccalaureate, including acceptable master's degree work, and up to 18 credits for dissertation is required for the PhD degree.
3. PhD students will be required to spend a minimum of two semesters, full-time, on the UND campus after receiving a master's degree.
4. Students must complete at least 6 credits of approved academic work per year.
5. By the end of the second semester in the doctoral program, the student will select a chair of his/her Advisory Committee. By the end of the third semester, the student will select membership of the Advisory Committee, in consultation with the chair. The Advisory Committee will have at least five members, at least three of which must be from the ESSP faculty. One of the committee members will be appointed by the Dean of the School of Graduate Studies. That member will be from outside the ESSP Department. The committee will assist the student in course selection and definition of a research topic and will also administer and evaluate all examinations that are required for completion of the degree.
6. ESSP PhD students must file with the School of Graduate Studies an approved program of study by the end of their third semester.
7. Students must maintain a GPA of at least 3.00 from the start of the Ph.D. program in ESSP, with no grades below “B” and comply with the requirements of the School of Graduate Studies. Any student whose GPA falls below 3.00 will be placed on probation and will have one semester to raise the GPA to 3.00 or above.
8. All students must take a qualifying exam to advance to candidacy in the PhD program. Part of the written requirement requires all students to write a dissertation proposal in a style appropriate for submission to a funding organization or agency. Students will present their proposal for review no later than two years from the date of admission to the ESSP doctoral program. To be advanced to candidacy the PhD student will also take a qualifying exam, which will be administered during the student’s third year. Successful completion, and oral defense, of a dissertation is also required for the PhD degree.
9. All exams will be administered and evaluated by the student’s Advisory Committee.
   
   ESSP 503 Environmental Policy & Science 3
   ESSP 504 The Biosphere 3
   ESSP 505 Energy Issues and Earth Systems 3
   ESSP 506 Ecosystem Services: Valuing Nature in a Market Society 3
   ESSP 507 Earth Systems Processes and Vulnerability Analysis 3
   ESSP 508 Hydrological Cycle in Earth Systems 3
   ESSP 590 Colloquium Series 2
   Electives 6-40
   ESSP 596 Doctoral Research 24-48
   ESSP 999 Dissertation 6-18

Total Credits 56-126
6. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

Degree Requirements

Students seeking the Master of Environmental Management degree at the University of North Dakota must meet all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Earth System Science and Policy Department.

The overarching goal of all the degree programs offered in Earth System Science and Policy is to facilitate the acquisition of skills required to solve environmental problems or to seize opportunities presented by a changing environment. Much of the responsibility for learning rests upon the student.

1. Students enrolled in the MEM program will take the following sequences. Students will complete the basic two-semester core sequence of courses during their first year of study.

- ESSP 503 Environmental Policy & Science 3
- ESSP 504 The Biosphere 3
- ESSP 505 Energy Issues and Earth Systems 3
- ESSP 506 Ecosystem Services: Valuing Nature in a Market Society 3
- ESSP 507 Earth Systems Processes and Vulnerability Analysis 3
- ESSP 508 Hydrological Cycle in Earth Systems 3
- ESSP 590 Colloquium Series 2

2. A minimum of 36 credits, including three to nine credits for Internship is required.

3. At least one-half of the credits must be at or above the 500 level.

4. A maximum of one-fourth (usually 8-9 semester credits) of the credit hours required for the degree may be transferred from another institution.

5. By the end of the first semester the student will select a chair of her/his Advisory Committee and, in consultation with that chair, recommend membership on the Advisory Committee by the end of the second semester.

6. Students must file with the School of Graduate Studies an approved program of study at the end of the second semester.

7. Students must complete the basic two-semester core sequences of courses during their first year of study. Students will complete the basic two-semester core sequence of courses during their first year of study.

8. Complete written and oral comprehensive examinations to qualify for candidacy in the MEM program. These will occur no later than one month before leaving for the internship and will entail a 5 to 15 page written description and an oral presentation of their intended internship project.

9. In place of a thesis, MEM students must submit a comprehensive written report of their internship with an appropriate organization. The written report will be in the form of an Independent Study Report, following the guidelines and procedures for such a report set by the School of Graduate Studies. Grades poorer than “C” will not be accepted as fulfilling degree requirements.

10. All exams will be administered and evaluated by the student’s Advisory Committee.

- ESSP 503 Environmental Policy & Science 3
- ESSP 504 The Biosphere 3
- ESSP 505 Energy Issues and Earth Systems 3
- ESSP 506 Ecosystem Services: Valuing Nature in a Market Society 3
- ESSP 507 Earth Systems Processes and Vulnerability Analysis 3
- ESSP 508 Hydrological Cycle in Earth Systems 3
- ESSP 590 Colloquium Series 2

Electives 5-11
- ESSP 597 Internship 3-9
- ESSP 997 Independent Study 2

Total Credits 30-42

Master of Science in Earth System Science and Policy

Admission Requirements

Applicants who are seeking admission to School of Graduate Studies must meet all of the minimum general education requirements identified in the graduate catalog. In addition, students must fulfill the requirements below for admission to Earth System Science and Policy M.S. degree program.

1. Hold a bachelor’s degree from an accredited college or university.
2. Have satisfactorily completed a minimum of college-level algebra plus 3 credits of college statistics or calculus.
3. Have completed a minimum of 12 semester credits in the natural or physical sciences, e.g., physics, chemistry, geosciences, biology or related sciences.
4. Have earned a minimum average GPA of 3.00 on a 4.00 scale, on all upper division college-level coursework.
5. Submit score from the Graduate Record Examination (GRE) General Test.
6. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

Degree Requirements

Students seeking the Master of Science degree at the University of North Dakota must meet all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Earth System Science and Policy Department.

The overarching goal of all the degree programs offered in Earth System Science and Policy is to facilitate the acquisition of skills required to solve environmental problems or to seize opportunities presented by a changing environment. Much of the responsibility for learning rests upon the student.

1. Students enrolled in the MS program will take the following sequences. Students will complete the basic two-semester core sequences of courses during their first year of study.

- ESSP 503 Environmental Policy & Science 3
- ESSP 504 The Biosphere 3
- ESSP 505 Energy Issues and Earth Systems 3
- ESSP 506 Ecosystem Services: Valuing Nature in a Market Society 3
- ESSP 507 Earth Systems Processes and Vulnerability Analysis 3
- ESSP 508 Hydrological Cycle in Earth Systems 3
- ESSP 590 Colloquium Series 2

2. A minimum of 36 credits beyond the baccalaureate is required, including six to nine credits for thesis.

3. At least one-half of the credits must be at or above the 500 level.

4. A maximum of one-fourth (usually 8-9 semester credits) of the credit hours required for the degree may be transferred from another institution.

5. By the end of the first semester the student will select a chair of her/his Advisory Committee and, in consultation with that chair, recommend membership on the Advisory Committee by the end of the second semester. The Advisory Committee will have 3 members, at least two of whom must be from the ESSP faculty. If the student is pursuing a minor concurrently with the MS in ESSP, one of the committee members will be from the department of the minor.

6. Students must maintain a GPA of 3.00 from the start of the graduate program in ESSP, and comply with the requirements of the School of Graduate Studies. Grades poorer than “C” will not be accepted as fulfilling degree requirements.

7. Students must complete the basic two-semester core sequences of courses during their first year of study.

- ESSP 503 Environmental Policy & Science 3
- ESSP 504 The Biosphere 3
- ESSP 505 Energy Issues and Earth Systems 3
- ESSP 506 Ecosystem Services: Valuing Nature in a Market Society 3
- ESSP 507 Earth Systems Processes and Vulnerability Analysis 3
- ESSP 508 Hydrological Cycle in Earth Systems 3
- ESSP 590 Colloquium Series 2

Electives 5-11
- ESSP 597 Internship 3-9
- ESSP 997 Independent Study 2

Total Credits 30-42

Have completed a minimum of 12 semester credits in the natural or physical sciences, e.g., physics, chemistry, geosciences, biology or related sciences.

Have earned a minimum average GPA of 3.00 on a 4.00 scale, on all upper division college-level coursework.

Have earned a minimum average GPA of 3.00 on a 4.00 scale, on all upper division college-level coursework.

Have earned a minimum average GPA of 3.00 on a 4.00 scale, on all upper division college-level coursework.

Have earned a minimum average GPA of 3.00 on a 4.00 scale, on all upper division college-level coursework.

Have earned a minimum average GPA of 3.00 on a 4.00 scale, on all upper division college-level coursework.

Have earned a minimum average GPA of 3.00 on a 4.00 scale, on all upper division college-level coursework.
ECON 334. Further Topics in Econometrics. 3 Credits.
This is an applied course in economics, the purpose of which is to build on the tools learned in previous coursework, learn new tools, and discover how to apply these tools to the analysis of data from the real world. The course includes theory, though the focus is on applying the tools of modern econometrics to the study of cross sectional, time series, and panel data. Prerequisites: ECON 506. F.

ECON 545. Quantitative Methods for Impact Evaluation & Causal Inference. 3 Credits.
This course aims to familiarize the student with the current literature on the economics and econometrics of policy and program evaluation. Prerequisites: ECON 506. S.

ECON 555. Demographic Methods for Economics. 3 Credits.
We examine the three key demographic processes: mortality, fertility, and migration. The course emphasis will be on model development for each of the processes. Applications include economic policy issues such as pensions, medical insurance, and other current issues. Prerequisite: ECON 210. SS.

ECON 575. Advanced Special Topics. 1-3 Credits.
Topics of course will change from semester to semester but will typically emphasize an important aspect of economic theory or a significant issue in economic policy. Repeatable to 6 credits with different topics. Repeatable to 6 credits.

ECON 580. Economic Development: Global, National, and Regional Issues. 3 Credits.
The first part of this course focuses on growth theories, globalization and economic development and sustainable growth among less developed, developing, and more developed countries, as well as countries in transition to market economies. The second part of the course specifically examines economic development for advanced nations, incorporating rural, urban and regional economic analysis. Issues such as rural technology, employment, poverty, housing, transportation, location problems, industrialization, urbanization and sustainable growth in North Dakota and North Central Region are explored. Prerequisite: Department consent. F.

ECON 592. Research in Economics. 2-3 Credits.
Research work and use of original documents; collecting of material and preparing of special topics and bibliographies; familiarizing the student with government publications and other material available for study of economic problems.

ECON 596. Applied Economics Research Seminar. 3 Credits.
Seminar course intended to strengthen and further develop essential skills of research and formal presentation (written and oral) for both academic and professional audiences. Students will apply these skills to the development of their individual Independent Study or Thesis Project Proposal. Enrollment is restricted to MSAE degree students who plan to complete their Independent Study or Thesis in the following academic year. Prerequisites: ECON 504, ECON 505, and ECON 506. SS.

ECON 597. Economic Research Internship. 1-3 Credits.
An internship is designed to provide the student with an opportunity for participating in a supervised work experience directly related to the field of training. Students will work closely with the program adviser in planning the internship with an approved cooperating institution. Repeatability is 3 credits. F, S, SS.

ECON 598. Thesis. 4 Credits.
The thesis is an original research project completed under the supervision of a thesis committee.

<table>
<thead>
<tr>
<th>Courses</th>
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<tbody>
<tr>
<td>ECON 503. Government and Business. 3 Credits.</td>
<td>3</td>
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<tr>
<td>ECON 504. Microeconomic Theory &amp; Applications. 3 Credits.</td>
<td>3</td>
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<td>3</td>
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<tr>
<td>ECON 506. Econometrics. 3 Credits.</td>
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<tr>
<td>ECON 507. Earth Systems Processes and Vulnerability Analysis. 3 Credits.</td>
<td>3</td>
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<tr>
<td>ECON 508. Hydrological Cycle in Earth Systems. 3 Credits.</td>
<td>3</td>
</tr>
<tr>
<td>ECON 509. Colloquium Series. 2 Credits.</td>
<td>2</td>
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<tr>
<td>ECON 510. Time Series Methods &amp; Applications. 3 Credits.</td>
<td>3</td>
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<tr>
<td>ECON 511. Advanced Managerial Economics. 3 Credits.</td>
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<tr>
<td>ECON 512. Advanced International Economics. 3 Credits.</td>
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<th>Electives</th>
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<tbody>
<tr>
<td>ECON 598. Thesis. 4 Credits.</td>
<td>4-9</td>
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</table>

Total Credits: 31-42
Undergraduate Courses for Graduate Credit

**ECON 324. Public Finance. 3 Credits.**
Growth and effects of the public sector of the economy emphasizing effects of taxation and spending or borrowing and debt management on efficiency and use of economic resources. Prerequisites: ECON 201 and ECON 202.

**ECON 338. International Economics. 3 Credits.**
Economic basis for gain in international trade; capital and population movements; international disequilibrium and the process of balance-of-payments adjustments; tariffs, underdeveloped countries. Prerequisites: ECON 201 and ECON 202. F.S.

**ECON 341. Labor Economics and Labor Relations. 3 Credits.**
A survey of the nature and causes of the economic problems of the American wage and salary earner and of the attempts of wage earners and society, through organizations and legislation, to alleviate these problems. The course comparatively surveys the history and systematic theories of labor movements and the market and institutional influences on wages and employment. Particular emphasis will be placed on the law of industrial relations, employment and income access, and the adjustment of labor disputes. Prerequisites: ECON 201 and ECON 202. F.

**ECON 355. Government Regulation of Business. 3 Credits.**
An exploration of the many ways that federal and state governments regulate business activity. Government regulation falls into three broad areas: economic regulation; social regulation; antitrust laws. The historical development of regulation, from both a legal and economic perspective, will be discussed. Particular attention will be paid to the current trend toward deregulation of previously regulated industries such as airlines, telecommunications, and trucking. Prerequisites: ECON 201 and ECON 202. F.

**ECON 400. History of Economic Thought. 3 Credits.**
Broad overview of the major schools of thought including Mercantilist, Physiocrat, Classical, Marxian, Socialist, Historical, Austrian, Neoclassical, Institutional, Keynesian, and Monetarist. The coverage includes value theory, income/expenditure theory, growthdevelopment theory, scientific method, scope and public policy. Prerequisites: ECON 105 or ECON 201, and ECON 202. S.

**ECON 410. Empirical Methods in Economics I. 3 Credits.**
This course is an introduction to econometrics, the joint area of economics and statistics dealing with the application of statistics to economic problems. The course objectives are to acquire a basic understanding of the theory and methods of econometrics and to gain practical experience in utilizing these methods. The students will use the tools developed in the course in homework and written assignments so that they can develop an insight to theory and its application. Prerequisites: ECON 201, ECON 202 and ECON 210. F.

**ECON 411. Economic Forecasting. 3 Credits.**
An introduction to Economics Forecasting and Time Series Analysis. The course will cover specifications and estimation of ARMA models, seasonality, non-stationarity, unit roots and forecast evaluations. Empirical applications are used throughout the course. Prerequisite or Corequisite: ECON 410 or ECON 506. S.

**ECON 416. Mathematics for Economists. 3 Credits.**
Study of mathematical methods in the areas of introductory calculus and linear algebra, and their application to economic analysis. Mathematical analysis of static and dynamic equilibrium models, growth models, distribution, production functions, cycles, activity analysis, mathematical programming, and model building. Prerequisite: MATH 146 or MATH 165. Prerequisite or Corequisites: ECON 308. F.

**ECON 438. International Money and Finance. 3 Credits.**
Identification of key international financial concepts and analysis of their relationships in the international money and capital markets; determination of the balance of payments and exchange rates; and examination of alternative organizations of the international monetary system. Prerequisite: ECON 303. F.

Master of Science in Applied Economics

**Admission Requirements**

1. A four-year bachelor’s degree from a recognized college or university.
2. An overall undergraduate grade point average of 2.75 or greater for all undergraduate work or a GPA of at least 3.0 for the junior and senior years of undergraduate work (based on A=4.0).
3. Official scores from the Graduate Record Examination (GRE) General Test or Graduate Management Admission Test (GMAT). Students with strong quantitative backgrounds, including current and former UND undergraduate STEM majors, or, students holding a graduate degree in a business or STEM related field from an AACSB accredited institution, may request a waiver of the GRE/GMAT requirement.
4. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.
5. Complete undergraduate intermediate microeconomics, one semester of calculus, and one semester of probability and statistics, or equivalent.
6. Applicants may be eligible for admission in “Provisional” status with six credits of requisite undergraduate work provided that they meet all other stated admission criteria. In such cases, the student must satisfy all conditions in her/his admission letter in order to advance to “Approved” status. Failure to address the conditions of admission as stated in the admission letter will be viewed as unsatisfactory progress and could result in dismissal from the School of Graduate Studies.

**Combined BS/MSAE Option:** A combined BS/MSAE option is available to outstanding undergraduates who have completed 90 semester hours in a bachelor’s program at UND.

ECON 416 Mathematics for Economists and ECON 411 Economic Forecasting are the two courses that students in the combined program are permitted to count toward both a UND bachelor’s degree and the MSAE degree, but only if these courses are declared for graduate credit. All other courses taken for credit in the combined program must satisfy only bachelor’s program requirements, or only MSAE program requirements.

Interested students should consult with the MSAE Program Director.

**Accelerated Bachelors/Masters (ABM) 5-Year Degree Option:** The ABM degree program allows exceptional undergraduate students at UND an opportunity to complete the requirements for both the bachelor’s and master’s degrees at an accelerated pace. Undergraduates in both the BBA in Business Economics and the BA in Economics are eligible for consideration for the ABM. All requirements for both the undergraduate and MSAE degrees must be met, and these students may double count up to 12 graduate-level credits towards the requirements for their undergraduate degree and their MSAE degree requirements. ABM students must obtain their MSAE degree within 12 months of completing their undergraduate degree, provided that the degree requirements can be completed in that timeframe.

Admission to the ABM is a competitive process. The following are minimum eligibility requirements:

1. Students must meet the School of Graduate Studies admissions eligibility requirements.
2. Students must have completed a minimum of 60 credits, including credits earned from advanced placement and dual credit. Students must apply before completion of the undergraduate degree.
3. Transfer students with a minimum of 60 credits-whether from the transfer institution alone or in combination with UND credits-must have a minimum cumulative GPA of 3.0/4.0 at the time of admission to the ABM program.
4. Students must have a minimum cumulative GPA of 3.0/4.0 at UND at the time of admission into the ABM program.
5. ABM program applicants must submit the standard application to the School of Graduate Studies, the application fee, a personal statement, and transcripts. ABM program applicants do not need to take the GRE/GMAT.
6. Additionally, ABM program applicants must submit a detailed Program of Study that describes the 12 credits of double counted courses, the courses that will be taken after being accepted into the MSAE program, the courses that will be taken before graduation from either of the eligible undergraduate programs, and the expected graduation date for each degree. The submitted program of study must be signed by the student, the student's undergraduate advisor, the student's graduate advisor, and the MSAE Program Director.
Degree Requirements

Students seeking the Master of Science in Applied Economics degree through the Department of Economics & Finance at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Department of Economics & Finance.

The minimum number of credits for completing the MSAE is 30 credits. The MSAE curriculum consists of (i) an Economics Core, (ii) a set of Data Analytics courses, (iii) an Independent Study, and, (iv) a minimum of one 3-credit elective. The Independent Study serves as a capstone for the program and allows students to demonstrate their command of the methods and perspectives taught in the program in investigating a substantive problem. The program is designed to be completed within two academic years (5 semesters).

Economics Core (12 credit hours)

Required courses:

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>ECON 416</td>
<td>Mathematics for Economists</td>
<td>3</td>
</tr>
<tr>
<td>ECON 504</td>
<td>Microeconomic Theory &amp; Applications</td>
<td>3</td>
</tr>
<tr>
<td>ECON 505</td>
<td>Macroeconomic Theory &amp; Applications</td>
<td>3</td>
</tr>
<tr>
<td>ECON 506</td>
<td>Econometrics (Econometrics)</td>
<td>3</td>
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<td></td>
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Data Analytics (12 credit hours)

Required courses:

<table>
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<tr>
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<tbody>
<tr>
<td>ECON 510</td>
<td>Time Series Methods &amp; Applications</td>
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</tr>
<tr>
<td>ECON 534</td>
<td>Further Topics in Econometrics</td>
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</tr>
<tr>
<td>ECON 545</td>
<td>Quantitative Methods for Impact Evaluation &amp; Causal Inference</td>
<td>3</td>
</tr>
<tr>
<td>ECON 411</td>
<td>Economic Forecasting</td>
<td>3</td>
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<td>Total Credits</td>
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</tbody>
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Independent Study (3 credit hours)

<table>
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<tr>
<th>Course</th>
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<tr>
<td>ECON 997</td>
<td>Independent Study</td>
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</tr>
<tr>
<td></td>
<td>Total Credits</td>
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</tbody>
</table>

*Electives (minimum of 3 credit hours)

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>ECON 438</td>
<td>International Money and Finance</td>
<td>3</td>
</tr>
<tr>
<td>ECON 503</td>
<td>Government and Business</td>
<td>3</td>
</tr>
<tr>
<td>ECON 524</td>
<td>Advanced International Economics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 565</td>
<td>Demographic Methods for Economics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 575</td>
<td>Advanced Special Topics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 597</td>
<td>Economic Research Internship</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Total Credits</td>
<td>12</td>
</tr>
</tbody>
</table>

*Examples shown; offerings may vary from semester to semester. Choices of cognate electives must be determined in consultation with and approved by the MSAE program director. Courses previously taken from UND for undergraduate credit may not be used to satisfy MSAE requirements.

Education

Educational Foundations and Research (p. 384)

Educational Leadership

Teaching and Learning (p. 392)

Curriculum and Instruction (p. 397)

Early Childhood Education

Elementary Education

English Language Learners

Higher Education

Instructional Design and Technology

Reading Education

Special Education (p. 423)

Educational Foundations and Research

M.S. in Educational Studies (p. 387)

Ph.D. in Educational Foundations and Research (p. 386)

Certificate in Learning Analytics (p. 386)

Certificate in Quantitative Research Methods (p. 386)

Courses

EFR 500. Introduction to the Foundations of Education. 3 Credits.

A problem-centered class dialogue on those philosophical, social, political and historical concepts of educational thought that have shaped the development of the learning experience. F,S,SS.

EFR 501. Psychological Foundations of Education. 3 Credits.

A study of the learning process with secondary emphasis on how the learning process is affected by individual differences, growth and development, and personality. A background in undergraduate Educational Psychology is assumed. Both theories of learning and theories of instruction are considered. Prerequisites: EFR 500 or consent of instructor.

EFR 502. Issues and Trends in Education. 3 Credits.

Examination of contemporary issues of pre-K-12 and higher education and some of the philosophical, political, social, and historical foundations which influence their development. Students will engage in public scholarship through issue advocacy projects. Prerequisites: EFR 500 or consent of instructor. On demand.

EFR 503. Historical Foundations of Education. 3 Credits.

An historical examination of the concepts of the meaning, nature, process, and purposes of education as evolved in different historical periods and social contexts with emphasis on the learners, ideas and changing institutions. Prerequisites: EFR 500 or consent of instructor.

EFR 504. Philosophical Foundations of Education. 3 Credits.

A study of the representative schools of thought which have structured major philosophies of education. Prerequisites: EFR 500 or consent of instructor.

EFR 505. Sociological Foundations of Education. 3 Credits.

The study of individuals, schools and education in their social contexts such as community, polity, equity, race, class, gender, and social reproduction. Focuses on the development of the field, its theories, and applications for educators. Prerequisites: EFR 500 or consent of instructor. On demand.

EFR 506. Multicultural Education. 3 Credits.

A review of the conceptual, historical and theoretical aspects of multicultural education. A major goal will be to provide educators with processes for incorporating multicultural education into educational environments; to meet the needs of culturally diverse students and to increase the cultural awareness and sensitivity of all students. North Dakota/Native American issues are primary elements of this course. Prerequisites: EFR 500 or consent of instructor.

EFR 507. Gender, Sexuality and Education. 3 Credits.

A critical feminist analysis of the history, philosophy, theory, curriculum, and practice of education. The roles of educators, students, society, biology, and policy are considered in the education of those of diverse sexes, genders and sexualities. Prerequisites: EFR 500 or consent of instructor.

EFR 508. Anthropological Foundations of Education. 3 Credits.

Students will examine the convergence of anthropology and education through an analysis of education as cultural transmission and a review of enculturation and acculturation processes in traditional and modern societies. Prerequisites: EFR 500 or consent of instructor.

EFR 509. Introduction to Applied Educational Research. 3 Credits.

An introduction to applied research methodologies used to study education. The course covers quantitative as well as qualitative types of research. The paradigms of both types of research will be contrasted and the application of the methodologies in actual research investigated. F,S,SS.
EFR 510. Qualitative Research Methods. 3 Credits.
Qualitative research methods are naturalistic and contextual. The methodology derives from Anthropology and other social sciences, and seeks to understand human behavior from the actors' perspective. Students are to learn the fundamental data collection methods: observation, participant observation, and interviewing, as well as data analysis through coding and categorizing.

EFR 511. Program Evaluation. 3 Credits.
An interdisciplinary course which studies the theoretical models of program evaluation as well as professional standards. Emphasis is on the analysis of models for implementation and application in various social and public policy fields, as well as education. S.

EFR 512. Survey and Test Design. 3 Credits.
An introduction to designing surveys for social science research and tests in educational settings. Students gain theory and skills in construction, data collection, and evaluation of surveys and educational tests. S, even years.

EFR 513. Large Dataset Management and Analysis. 3 Credits.
A study of educational and social science statistics involving gathering, managing, manipulation and analysis of large data sets, both local and national, using SPSS and/or SAS. Prerequisite or Corequisite: EFR 515 or consent of instructor. On demand.

EFR 514. Discourse Analysis. 3 Credits.
Discourse analysis is a research methodology used to analyze naturally occurring language use, whether in writing or in speech. It draws from and is practiced in many social science and humanities disciplines related to the foundations of education, including linguistics, sociology, anthropology, communications, and cognitive and social psychology. This course will provide students with the building blocks of performing discourse analysis, including instruction in its philosophical foundations, its practices, and its implications.

EFR 515. Statistics I. 3 Credits.
An introduction to basic statistical methods, focusing primarily on descriptive statistics and inferential statistics up to and including two-way analysis of variance.

EFR 516. Statistics II. 3 Credits.
An in-depth study of inferential statistics with primary emphasis on analysis of variance models, multiple regression techniques, analysis of covariance and other higher-order statistical procedures. Prerequisites: EFR 515 or consent of instructor. S,SS.

EFR 517. Advanced Research Methodologies. 3 Credits.
Both qualitative and quantitative aspects of research are considered for a variety of topics, including ethics in research, use of data banks, Q-methodology, survey research, Bayesian concepts, critical theory, longitudinal research and research consultation. Comprehensive examinations in educational research are addressed. This is a capstone course in educational research. Previous or concurrent involvement in research is highly desirable. Available for doctoral level students only.

EFR 518. Multivariate Analysis. 3 Credits.
Multiple regression in generalized problem solving; discriminant analysis, factor analysis, multivariate analysis, canonical analysis, and multivariate analysis of covariance. Students are encouraged to analyze their own data including student-generated computer applications.

EFR 519. Research Seminar. 1-4 Credits.
Experimental Design–An in-depth treatment of analysis of variance designs including factorial designs, treatment by subjects designs, groups within treatment designs, latin squares, higher dimensional designs, mixed effect designs, analysis of covariance, and trend analysis. Emphasis is placed on underlying linear models. Other seminars are held on specific research topics, particularly research proposals. May be repeated. Repeatable.

EFR 520. Advanced Qualitative Research Methods. 3 Credits.
Advanced Qualitative Research Methods will engage students in more in-depth and complex theoretical and practical issues associated with the methodology. Students will conduct mini-research studies and examine qualitative studies conducted by others. Knowledge about IRB requirements will also be addressed. Prerequisites: EFR 510 or consent of instructor.

EFR 521. Program Evaluation. 3 Credits.
An interdisciplinary course which studies the theoretical models of program evaluation as well as professional standards. Emphasis is on the analysis of models for implementation and application in various social and public policy fields, as well as education. S.

EFR 522. Mixed-Methods Research. 3 Credits.
Mixed-methods research is the practice of combining quantitative and qualitative analysis within a single study. Students will learn the history and conceptual underpinnings of this methodological practice, read exemplary empirical studies that use mixed-methods, and explore the major mixed-methods designs. To apply these understandings, students will conduct a mixed-methods study on a topic of their own interests. Prerequisites: EFR 510 and EFR 516, or consent of instructor. S.

EFR 523. Structural Equation Modeling. 3 Credits.
This course builds from analyses underpinning structural equation modeling (SEM), such as reliability, exploratory factor analysis, and multiple regression, to SEM topics including path analysis, model specification and identification, goodness of fit, confirmatory factor analysis, structural models, mediation, multiple group invariance testing, and more. To apply these lessons, students will gain skills using SEM software. Prerequisite: EFR 516 or permission of the instructor. On demand.

EFR 524. Needs Assessment. 3 Credits.
Needs assessment is a common evaluation method. This interdisciplinary course will study the concept of needs as well as the processes and techniques of conducting needs assessment. A set of techniques for implementation and application of needs assessment in various community, education, social work, public health, business/industry settings, government, and non-profit agencies will be reviewed. F.

EFR 525. International and Comparative Education. 3 Credits.
An overview of the major issues, concepts and methods of comparative and international education. Focuses on the development of the field, the uses of comparison, the impact of globalization, and policy and practice development around the world at all levels of education. Prerequisites: EFR 500 or consent of instructor.

EFR 526. Advanced Qualitative Research Methods. 3 Credits.
Advanced qualitative methods are naturalistic and contextual. The methodology derives from Anthropology and other social sciences, and seeks to understand human behavior from the actors' perspective. Students are to learn the fundamental data collection methods: observation, participant observation, and interviewing, as well as data analysis through coding and categorizing.

EFR 527. Survey and Test Design. 3 Credits.
An introduction to designing surveys for social science research and tests in educational settings. Students gain theory and skills in construction, data collection, and evaluation of surveys and educational tests. S, even years.

EFR 510. Qualitative Research Methods. 3 Credits.
Qualitative research methods are naturalistic and contextual. The methodology derives from Anthropology and other social sciences, and seeks to understand human behavior from the actors' perspective. Students are to learn the fundamental data collection methods: observation, participant observation, and interviewing, as well as data analysis through coding and categorizing.

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An in-depth study of inferential statistics with primary emphasis on analysis of variance models, multiple regression techniques, analysis of covariance and other higher-order statistical procedures. Prerequisites: EFR 515 or consent of instructor. S,SS.

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Both qualitative and quantitative aspects of research are considered for a variety of topics, including ethics in research, use of data banks, Q-methodology, survey research, Bayesian concepts, critical theory, longitudinal research and research consultation. Comprehensive examinations in educational research are addressed. This is a capstone course in educational research. Previous or concurrent involvement in research is highly desirable. Available for doctoral level students only.

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Advanced Qualitative Research Methods will engage students in more in-depth and complex theoretical and practical issues associated with the methodology. Students will conduct mini-research studies and examine qualitative studies conducted by others. Knowledge about IRB requirements will also be addressed. Prerequisites: EFR 510 or consent of instructor.

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An interdisciplinary course which studies the theoretical models of program evaluation as well as professional standards. Emphasis is on the analysis of models for implementation and application in various social and public policy fields, as well as education. S.

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Mixed-methods research is the practice of combining quantitative and qualitative analysis within a single study. Students will learn the history and conceptual underpinnings of this methodological practice, read exemplary empirical studies that use mixed-methods, and explore the major mixed-methods designs. To apply these understandings, students will conduct a mixed-methods study on a topic of their own interests. Prerequisites: EFR 510 and EFR 516, or consent of instructor. S.

EFR 523. Structural Equation Modeling. 3 Credits.
This course builds from analyses underpinning structural equation modeling (SEM), such as reliability, exploratory factor analysis, and multiple regression, to SEM topics including path analysis, model specification and identification, goodness of fit, confirmatory factor analysis, structural models, mediation, multiple group invariance testing, and more. To apply these lessons, students will gain skills using SEM software. Prerequisite: EFR 516 or permission of the instructor. On demand.

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EFR 526. Advanced Qualitative Research Methods. 3 Credits.
Advanced qualitative methods are naturalistic and contextual. The methodology derives from Anthropology and other social sciences, and seeks to understand human behavior from the actors' perspective. Students are to learn the fundamental data collection methods: observation, participant observation, and interviewing, as well as data analysis through coding and categorizing.

EFR 527. Survey and Test Design. 3 Credits.
An introduction to designing surveys for social science research and tests in educational settings. Students gain theory and skills in construction, data collection, and evaluation of surveys and educational tests. S, even years.
EFR 997. Independent Study M Ed & M S. 2 Credits.
EFR 998. Thesis. 1-9 Credits.
EFR 999. Dissertation. 1-15 Credits. Repeatable to 15 credits.

Certificate in Learning Analytics

Requirements

Required courses:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EFR 513</td>
<td>Large Dataset Management and Analysis</td>
<td>3</td>
</tr>
<tr>
<td>EFR 515</td>
<td>Statistics I (prerequisite for EFR 513)</td>
<td>3</td>
</tr>
<tr>
<td>EFR 530</td>
<td>Learning Analytics (prerequisite for EFR 535)</td>
<td>3</td>
</tr>
<tr>
<td>EFR 535</td>
<td>Data Analytics and Visualization with R</td>
<td>3</td>
</tr>
</tbody>
</table>

*Relevant courses offered at UND not listed will be considered and may be included with approval from certificate coordinator.

Certificate in Quantitative Research Methods

Education Track:

For the 12-credit certificate, students are required to take:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EFR 516</td>
<td>Statistics II</td>
<td>3</td>
</tr>
<tr>
<td>EFR 518</td>
<td>Multivariate Analysis</td>
<td>3</td>
</tr>
</tbody>
</table>

And choose two of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EFR 512</td>
<td>Survey and Test Design</td>
<td>3</td>
</tr>
<tr>
<td>EFR 513</td>
<td>Large Dataset Management and Analysis</td>
<td>3</td>
</tr>
<tr>
<td>EFR 517</td>
<td>Advanced Research Methodologies</td>
<td>3</td>
</tr>
<tr>
<td>EFR 522</td>
<td>Mixed-Methods Research</td>
<td>3</td>
</tr>
<tr>
<td>EFR 523</td>
<td>Structural Equation Modeling</td>
<td>3</td>
</tr>
</tbody>
</table>

* Relevant courses offered at UND not listed will be considered and may be included with approval from certificate coordinator

Psychology Track:

For the 12-credit certificate, students are required to take:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYC 541</td>
<td>Advanced Univariate Statistics</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 542</td>
<td>Multivariate Statistics for Psychology</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 543</td>
<td>Experimental Design</td>
<td>3</td>
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</tbody>
</table>

And choose one of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYC 595</td>
<td>Seminar in Psychology</td>
<td>1-3</td>
</tr>
<tr>
<td>EFR 513</td>
<td>Large Dataset Management and Analysis</td>
<td>3</td>
</tr>
<tr>
<td>EFR 523</td>
<td>Structural Equation Modeling</td>
<td>3</td>
</tr>
</tbody>
</table>

* Relevant courses offered at UND not listed will be considered and may be included with approval from certificate coordinator

Doctor of Philosophy in Educational Foundations and Research

Admission Requirements

Students with a master’s degree in a field unrelated to Education are eligible for admission to the Ph.D. program.

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

Important dates:

For admission in the Fall semester, please send your complete application materials by February 15; you will be advised of our decision by April 15. For admission in the Spring semester, please send your application materials by October 1; you will be advised of our decision by December 1.

International students should be aware that the School of Graduate Studies at the University of North Dakota does not recognize master’s degrees from institutions outside of the United States or Canada. Students must satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

Application materials should include:

1. Transcripts showing a bachelor’s degree from an accredited college or university
2. Transcripts showing a graduate degree from an accredited college or university
3. Graduate GPA of 3.5 and above
4. Three letters of reference
5. An essay that responds to questions provided in the application
6. A resume and a writing sample of 10-15 pages (separate from #5 above).
   Your writing sample should demonstrate the best of your intellectual abilities and/or creative work.
7. Optional: scores from the GRE exam, the Advanced GRE, or the Miller’s Analogy Test.

Degree Requirements

Students seeking the Doctor of Philosophy degree must satisfy all general requirements set forth by the School of Graduate Studies for the Ph.D., as well as the following:

1. A minimum of 90 credit hours beyond the bachelor’s degree
2. With approval of a student’s Faculty Advisory Committee, 30 credits from a master’s degree from an accredited institution will be applied to the doctoral program of study
3. Maintenance of a minimum of 3.0 GPA
4. Educational Foundations credit hours of 21 or 9 (depending on the emphasis)
5. Research Methodologies credit hours of 21 or 12 (depending on the emphasis)
6. A cognate of 12-15 credits (depending on emphasis)
7. A dissertation of 15 credits
8. The following course requirements:

Foundations of Education Emphasis

Select seven of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EFR 501</td>
<td>Psychological Foundations of Education</td>
</tr>
<tr>
<td>EFR 502</td>
<td>Issues and Trends in Education</td>
</tr>
<tr>
<td>EFR 503</td>
<td>Historical Foundations of Education</td>
</tr>
<tr>
<td>EFR 504</td>
<td>Philosophical Foundations of Education</td>
</tr>
<tr>
<td>EFR 505</td>
<td>Sociological Foundations of Education</td>
</tr>
<tr>
<td>EFR 506</td>
<td>Multicultural Education</td>
</tr>
<tr>
<td>EFR 507</td>
<td>Gender, Sexuality and Education</td>
</tr>
</tbody>
</table>
Master of Science in Educational Studies

Admission Requirements

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

Degree Requirements

A minimum of 32 credits, to include:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EFR 500</td>
<td>Introduction to the Foundations of Education</td>
<td>3</td>
</tr>
<tr>
<td>EFR 509</td>
<td>Introduction to Applied Educational Research</td>
<td>3</td>
</tr>
<tr>
<td>EFR 525</td>
<td>Anthropological Foundations of Education</td>
<td>6</td>
</tr>
<tr>
<td>EFR 512</td>
<td>Survey and Test Design</td>
<td>3</td>
</tr>
<tr>
<td>EFR 513</td>
<td>Large Dataset Management and Analysis</td>
<td>3</td>
</tr>
<tr>
<td>EFR 514</td>
<td>Discourse Analysis</td>
<td>3</td>
</tr>
<tr>
<td>EFR 516</td>
<td>Statistics II</td>
<td>3</td>
</tr>
<tr>
<td>EFR 517</td>
<td>Advanced Research Methodologies</td>
<td>3</td>
</tr>
<tr>
<td>EFR 520</td>
<td>Advanced Qualitative Research Methods</td>
<td>3</td>
</tr>
<tr>
<td>EFR 522</td>
<td>Mixed-Methods Research</td>
<td>3</td>
</tr>
<tr>
<td>EFR 523</td>
<td>Structural Equation Modeling</td>
<td>3</td>
</tr>
<tr>
<td>EFR 524</td>
<td>Needs Assessment</td>
<td>3</td>
</tr>
<tr>
<td>EFR 590</td>
<td>Special Topics in Education</td>
<td>3</td>
</tr>
<tr>
<td>EFR 591</td>
<td>Readings in Education (With advisor approval)</td>
<td>3</td>
</tr>
<tr>
<td>EFR 997</td>
<td>Independent Study M Ed &amp; M S</td>
<td>2-4</td>
</tr>
<tr>
<td>EFR 995</td>
<td>Scholarly Project</td>
<td>2-4</td>
</tr>
<tr>
<td>EFR 998</td>
<td>Thesis</td>
<td>2-4</td>
</tr>
</tbody>
</table>

Total Credits: 32-34

Required for all students, regardless of thesis or non-thesis:

1. A minimum of 32 credits, including both credits required for the major and credits for the independent study, scholarly project or thesis.
2. At least one-half of the credits must be at or above the 500-level.
3. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.
4. The program may include the major and a non-EFR minor (a single discipline) or the major and a non-EFR cognate area (an interdisciplinary group of courses).

Thesis Option:

1. Four credits for the Thesis (EFR 998)
2. Preparation of a written thesis is approved by a committee of three faculty. The student’s advisor chairs the committee.
3. Presentation and defense of the thesis takes place before the final report is sent to the School of Graduate Studies.

Independent Study/Scholarly Project Option:

1. Two credits for the Independent Study (EFR 997) or Scholarly Project (EFR 995).
2. Pass a written final comprehensive examination covering the major field and, at the advisor's discretion, any secondary fields.

3. Preparation of a written independent study or scholarly project must be approved by the faculty advisor.

4. Presentation of independent study or scholarly project takes place before the final report is sent to the School of Graduate Studies.

### Educational Leadership

**M.S. in Educational Leadership** (p. 392)

**Specialist Diploma** (p. 392)

**Ph.D. in Educational Leadership** (p. 390)

**M.Ed. in Educational Leadership** (p. 391)

**Ed.D. in Educational Leadership** (p. 389)

#### Courses

**EDL 501. Leadership and Organizational Behavior. 3 Credits.** This course provides school leaders with preparation in skills for providing purpose and direction for individuals and groups, shaping school culture and value, facilitating the development of shared strategic vision for the school, formulating goals and planning change efforts with staff, and setting priorities for one's school in the context of community and district priorities for student and staff needs.

**EDL 502. Technology and Information Systems. 2 Credits.** This course provides an understanding of selected computer applications for educational administrators. The focus of instruction is to have educational leaders use the computer as a decision-making and planning tool for carrying out communication functions of administration at the building and district levels.

**EDL 503. Seminar Educational Leadership. 1-4 Credits.** Repeatable to 4 credits. Repeatable to 4 credits. S/U grading.

**EDL 511. Effective Administrative Communications. 3 Credits.** This course prepares aspiring school leaders to plan for their personal and professional development; understand and use the principles of interpersonal, oral, and written communication.

**EDL 512. Research, Measurement, and Program Evaluation. 3 Credits.** This course provides school leaders with an understanding of how to determine what diagnostic information is needed about students, staff, and the school environment; examine the extent to which outcomes meet or exceed defined standards, goals, or priorities for individuals or groups; draw inferences for program revisions; interpret and understand research, measurements, and evaluations; relate programs to desired outcomes; develop equivalent measures of incompetence; and design accountability mechanisms.

**EDL 513. Leading Curriculum and Learning. 3 Credits.** This course provides school leaders the ability to understand major curriculum design models, interpret school district curricula, initiate needs analyses, plan and implement with staff a framework for instruction, align curriculum with anticipated outcomes, monitor social and technological developments as they affect curriculum, and adjust content as needs and conditions change. Corequisite: EDL 535 or EDL 536 or EDL 537.

**EDL 514. Supervision and Staff Development. 3 Credits.** This course provides school leaders with preparation in skills for instructional improvement, working with faculty and staff to identify professional needs. Classes are designed for in-depth study and practice planning, organizing, and facilitating programs that improve faculty and staff effectiveness and are consistent with institutional goals and needs; supervising individuals and groups; providing feedback on performance; arranging for remedial assistance; engaging faculty and others to plan and participate in recruitment and development activities; and initiating self-development.

**EDL 515. Education Law and Ethics. 3 Credits.** This course is designed as a beginning law course for school administrators. In addition to the acquisition of legal knowledge as it relates to P-12 education, students are introduced to ethical perspectives that frequently influence the legal decision-making process.

**EDL 516. Education Finance and Policy. 3 Credits.** Includes such topics as the organization of and responsibility for education in the United States at the federal, state, and local levels; basic administrative theories, processes, and techniques; and major areas of concern in the operation of local schools. The course includes an experiential learning assignment in which students complete a budget project.

**EDL 517. Social, Cultural, Political, and Community Dimensions of Schools. 4 Credits.** This course provides school leaders with an understanding of the historical, philosophical, ethical, social, and economic influences affecting education to the degree that they can apply their understandings to professional decisions. Students are expected to apply political concepts and strategies and approaches to collaboration in involving the community in decision making, building community support for integrating health and social services in support of students, and developing community support for school priorities. Throughout the course, students' work will be expected to manifest a sensitivity to issues of diversity in a pluralistic society.

**EDL 519. Principalship. 2 Credits.** This course provides school leaders with an understanding of the role of the building principal along with skills and techniques associated with the principalship. The topics include the principal's role in community and family relationships and collaboration, using community resources to support the academic and social needs of students and families, the development and application of policies related to students and staff, planning and delivering curricular and cocurricular programs within the school, and the principal's role in working with staff. Students must also enroll in a one-credit field-based experience (EDL 520, 521 or 522) appropriate for their desired level of preparation for the principalship.

**EDL 520. Middle School Principal Field Study. 1 Credit.** This course provides a field-based experience in the role of the middle school principal. Corequisite: EDL 519.

**EDL 521. Elementary Principal Field Study. 1 Credit.** This course provides a field-based experience in the role of the elementary school principal. Corequisite: EDL 519.

**EDL 522. Secondary Principal Field Study. 1 Credit.** This course provides a field-based experience in the role of the secondary school principal. Corequisite: EDL 519.

**EDL 523. The Educational Plant. 3 Credits.** The purpose of this course is to provide a study of the planning, construction, modification, and maintenance of school buildings and complimentary facilities such as playgrounds, athletic fields and facilities, drop-off zones, and parking lots. This course will include appraisal of school facilities and techniques for developing and using input from the community and building and program audits.

**EDL 524. Educational Personnel Administration. 2 Credits.** Study of selection, assignment, evaluation, development, and release practices for certified and non-certified school personnel; salary and contract administration in schools.

**EDL 526. Business Management in Education. 2 Credits.** Study of the business function in educational organizations with emphasis on budget development and administration, accounting, purchasing, risk management, support services, and capital outlay.

**EDL 527. Legal Issues in Education. 3 Credits.** Study of the legal issues affecting educational organizations with emphasis on state and federal relationships to local institutions, school boards and other governing bodies, contracts, teachers' and students' rights, and tort liability of educational organizations and their officers. Consideration is given to legal research and policy analysis.

**EDL 529. Special Education Law. 3 Credits.** A course designed to give participants a working knowledge of the legislative, judicial, and administrative changes which have revamped the areas of teaching and administering special education since 1974. It will provide information useful to administrators, practitioners, attorneys, parents, and advocates on topics including: student records, discipline, related services, due process, least restrictive environment, and appropriate education.

**EDL 531. School District Leadership. 2 Credits.** A study of concerns and issues related to education leadership and administration at the district level, including relationships between the superintendent and the school board, community and school district staff.
EDL 532. Staff and Program Evaluation. 2 Credits.
A study of the evaluation of staff, including teachers, administrators, support personnel, and boards; and for purposes of accreditation, the evaluation of components that support the curriculum. Procedures, processes, and instruments will be identified and analyzed.

EDL 533. Collective Negotiations. 2 Credits.
A study of the collective bargaining process in the field of education. Includes topics such as contract language, planning for negotiations, bargaining strategies, impasse and arbitration, contract maintenance, grievance procedures, and results of the negotiations.

EDL 535. Administration of Elementary School Curriculum. 1-3 Credits.
Designed primarily for graduate students seeking positions as curriculum coordinators or administrative positions. A study of leadership skills for developing the administrator's understanding of knowledge construction, adult learning, planning and implementing a framework for curriculum design and instruction, and the professional responsibility for assessing and implementation of an elementary school curriculum. The course examines the current issues, trends, subject areas, student achievement, and challenges for the future of elementary curriculum. The student will research the current best practices for application of administrative skills in relationship to supervision of a comprehensive K-5 grade level curriculum and its impact on learners. Corequisite: EDL 513.

EDL 536. Administration of Middle School Curriculum. 1-3 Credits.
Designed primarily for graduate students seeking positions as curriculum coordinators or administrative positions. A study of leadership skills for developing the administrator's understanding of knowledge construction, adult learning, planning and implementing a framework for curriculum design and instruction, and the professional responsibility for assessing and implementation of the middle school level curriculum. The course examines the current issues, trends, subject areas, student achievement, and challenges for the future of middle school level curriculum. The student will research the current best practices for application of administrative skills in relationship to supervision of a comprehensive 6-8 grade level curriculum and its impact on learners. Corequisite: EDL 513.

EDL 537. Administration of Secondary School Curriculum. 1-3 Credits.
Designed primarily for graduate students seeking positions as curriculum coordinators or administrative positions. A study of leadership skills for developing the administrator's understanding of knowledge construction, adult learning, planning and implementing a framework for curriculum design and instruction, and the professional responsibility for assessing and implementation of secondary school curriculum. The course examines the current issues, trends, subject areas, student achievement, and challenges for the future of middle school level curriculum. The student will research the current best practices for application of administrative skills in relationship to supervision of a comprehensive 9-12 grade level curriculum and its impact on learners. Corequisite: EDL 513.

EDL 538. Auxiliary School Functions. 3 Credits.
Overview of school business and facilities management for educational administrators. Topics include: introduction to special area budgeting and accounting; insurance and risk management; forecasting; vendor relations; supervision of classified and support staff; management of support services, e.g., transportation, food service, facility operation and maintenance; and space utilization analysis, allocation; and cooperative community use of facilities.

EDL 571. School Community Relations. 2 Credits.
Study of the responsibility of classroom, attendance unit, and district personnel in public information efforts; design, use, and analysis of surveys; study of involvement of parents and other community members in resource, advisory, and decision-making activities; preparation of news releases and public information materials; study of relationships to media personnel.

EDL 572. Educational Systems and Planning. 2 Credits.
A study of the planning process including topics such as establishing goals; assessing needs; identifying resources; and generating, analyzing, and selecting alternatives. Processes and techniques in planning will be emphasized.

EDL 573. Administration and Organizational Behavior. 3 Credits.
A study and critique of selected theories and research in administration and organizational behavior including topics such as leadership; formal and informal structure; communication; change and intervention; motivation and morale; interpersonal relations and conflict management; small-group processes; and personality, values, and ethics. F.

EDL 574. Administration and Organizational Behavior II. 3 Credits.
A continuation of Administration and Organizational Behavior I. Provides the student with the opportunity to design and carry out an original field study project in organizational behavior, participate in critiquing studies designed and completed by fellow students, and engage in individualized study in a topic area related to behavior in organizations.

EDL 575. Education and Public Policy. 3 Credits.
A study of the development of policy issues, analysis of policy formation, implementation analysis, and structures and actors in policy activity.

EDL 579. Special Topics in Educational Leadership. 1-4 Credits.
Exploration of special topics in the study of educational leadership not regularly included in available course offerings. May be repeated for different topics. Prerequisite: Consent of instructor or advisor. Repeatable.

EDL 589. Superintendency Series. 1 Credit.
Repeatable.

EDL 593. Internship in Educational Leadership. 1-8 Credits.
This is a culminating experience primarily for Specialist Diploma and doctoral students. May be repeated. Prerequisites: Appropriate foundational, cognate, and major area coursework and consent of the advisor and instructor. Repeatable.

EDL 597. Readings in Educational Leadership. 1-4 Credits.
Designed primarily for advanced graduate students. May be repeated for different topics. Prerequisites: Consent of advisor and instructor. Repeatable.

EDL 599. Individual Research in Educational Leadership. 1-4 Credits.
May be repeated. Prerequisites: Consent of advisor and instructor. Repeatable.

EDL 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

EDL 997. Independent Study. 1-4 Credits.
Repeatable to 4 credits.

EDL 998. Thesis. 1-9 Credits.

EDL 999. Dissertation. 1-12 Credits.
Repeatable to 12 credits.

Doctor of Education in Educational Leadership

Admission Requirements
The following criteria will be used to assess a student’s application for admission into the doctoral programs in the Department of Educational Leadership. No single criterion can adequately predict a student’s probable success in graduate work; as such, candidates for admission to the doctoral programs are evaluated on the following criteria:

1. Completion of a master’s degree from an accredited college or university
2. Grade point average from all previous graduate work (minimum of 3.5 required)
3. Professional resume
4. Educational leadership essay
5. Statement of professional goals
6. Writing sample
7. Three (3) letters of recommendation
8. Satisfy the School of Graduate Studies' English Language Proficiency requirements as published in the Graduate Catalog.
9. Students who have received a bachelor's degree or higher from the United States or English-speaking Canada are not required to submit the TOEFL.
10. All PK-12 applicants are required to have a teaching credential, three years of teaching experience, and leadership experience in PK-12 environments.

Degree Requirements
Students seeking the Doctor of Education degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Educational Leadership Department.

The Ed.D. program in Educational Leadership is designed primarily for practitioners preparing for school administration positions including elementary
or secondary principalships, superintendencies, curriculum directorships, or other school district central office positions. Upon completion of the Ed.D. degree, a student generally will have completed the requirements for an administrative credential, including those required for the position of school superintendent in North Dakota.

1. A minimum of 96 semester credit hours of course work beyond the bachelor’s degree.
2. Maintenance of at least a 3.0 GPA for all graduate courses completed as a UND graduate student.
3. Completion of a dissertation, which incorporates independent work that is an original contribution to knowledge.
4. With approval of a student’s Faculty Advisory Committee, up to 30 credits from a master’s degree may be transferred from another institution.
5. Successful completion of comprehensive examinations in Educational Leadership and Educational Foundations.
6. Successful completion of a final examination.

Educational Leadership Core Courses
For PK-12 emphasis:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDL 501</td>
<td>Leadership and Organizational Behavior</td>
<td>3</td>
</tr>
<tr>
<td>EDL 511</td>
<td>Effective Administrative Communications</td>
<td>3</td>
</tr>
<tr>
<td>EDL 513</td>
<td>Leading Curriculum and Learning</td>
<td>3</td>
</tr>
<tr>
<td>EDL 514</td>
<td>Supervision and Staff Development</td>
<td>3</td>
</tr>
<tr>
<td>EDL 515</td>
<td>Education Law and Ethics</td>
<td>3</td>
</tr>
<tr>
<td>EDL 516</td>
<td>Education Finance and Policy</td>
<td>3</td>
</tr>
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</table>

Doctoral Core Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>EDL 503</td>
<td>Seminar Educational Leadership</td>
<td>1-4</td>
</tr>
<tr>
<td>EDL 572</td>
<td>Educational Systems and Planning</td>
<td>2</td>
</tr>
<tr>
<td>EDL 573</td>
<td>Administration and Organizational Behavior</td>
<td>3</td>
</tr>
<tr>
<td>EDL 575</td>
<td>Education and Public Policy</td>
<td>3</td>
</tr>
<tr>
<td>EDL 579</td>
<td>Special Topics in Educational Leadership</td>
<td>12</td>
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Educational Leadership PK-12

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDL 523</td>
<td>The Educational Plant</td>
<td>3</td>
</tr>
<tr>
<td>EDL 524</td>
<td>Educational Personnel Administration</td>
<td>2</td>
</tr>
<tr>
<td>EDL 526</td>
<td>Business Management in Education</td>
<td>2</td>
</tr>
<tr>
<td>EDL 527</td>
<td>Legal Issues in Education</td>
<td>3</td>
</tr>
<tr>
<td>EDL 529</td>
<td>Special Education Law</td>
<td>3</td>
</tr>
<tr>
<td>EDL 531</td>
<td>School District Leadership</td>
<td>2</td>
</tr>
<tr>
<td>EDL 532</td>
<td>Staff and Program Evaluation</td>
<td>2</td>
</tr>
<tr>
<td>EDL 571</td>
<td>School Community Relations</td>
<td>2</td>
</tr>
</tbody>
</table>

Foundations of Education

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EFR 500</td>
<td>Introduction to the Foundations of Education</td>
<td>3</td>
</tr>
</tbody>
</table>

Select three of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EFR 501</td>
<td>Psychological Foundations of Education</td>
<td></td>
</tr>
<tr>
<td>EFR 502</td>
<td>Issues and Trends in Education</td>
<td></td>
</tr>
<tr>
<td>EFR 503</td>
<td>Historical Foundations of Education</td>
<td></td>
</tr>
<tr>
<td>EFR 504</td>
<td>Philosophical Foundations of Education</td>
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<td>EFR 505</td>
<td>Sociological Foundations of Education</td>
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<td>EFR 506</td>
<td>Multicultural Education</td>
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<td>EFR 507</td>
<td>Gender, Sexuality and Education</td>
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<tr>
<td>EFR 508</td>
<td>Anthropological Foundations of Education</td>
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</tbody>
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Cognate Area(s)
One or two cognate areas outside Educational Leadership and often outside the field of Education to support the area of emphasis.

Scholarly Tools
Select from approved courses that provide the scholarly tools to support educational research

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>EDL 593</td>
<td>Internship in Educational Leadership</td>
<td>6</td>
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</table>

Dissertation

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<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>EDL 999</td>
<td>Dissertation</td>
<td>10</td>
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</table>

Total Credits: 99-121

* If the Master’s degree or Specialist Diploma did not include these courses or their equivalent, they must be completed as soon as possible after admission to the Ed.D. program.
** As appropriate, elective courses are selected from one of the following areas of emphasis to fulfill individual needs and goals in consultation with a student’s Faculty Advisory Committee. A minimum of 30 credits of Educational Leadership courses is required. A concentration of 48 credits in the major is required (including Educational Leadership courses, scholarly tools and dissertation).
  • Curriculum and Instruction
  • Leadership and General Administration
  • Management of Resources
*** EFR 515 Statistics I (or its equivalent) may not be used to fulfill Scholarly Tools.
**** Not required but often advisable, depending upon student experience and goals and these credits are reported in your major.

Doctor of Philosophy in Educational Leadership

Admission Requirements

The following criteria will be used to assess a student’s application for admission into the doctoral programs in the Department of Educational Leadership. No single criterion can accurately predict a student’s probable success in graduate work; as such, candidates for admission to the doctoral programs are evaluated on the following criteria:

1. Completion of a master’s degree from an accredited college or university
2. Grade point average from all previous graduate work (minimum of 3.5 required)
3. Professional resume
4. Educational leadership essay
5. Statement of professional goals
6. Writing sample
7. Three (3) letters of recommendation
8. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.
9. Students who have received a bachelor’s degree or higher from the United States or English-speaking Canada are not required to submit the TOEFL.
10. All PK-12 applicants are required to have a teaching credential, three years of teaching experience, and administrative experience in PK-12 environments.

Degree Requirements

Students seeking the Doctor of Philosophy degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Educational Leadership Department.

The Ph.D. program in Educational Leadership is designed for students preparing for positions in which research and creative experience are predominant interests. Ph.D. candidates are expected to have undertaken and completed independent research leading to an original contribution of knowledge in the field. It is generally expected that the Ph.D. dissertation will be publishable. This degree option typically provides preparation for those who aspire to leadership positions in higher education, in government agencies, or in other educational policy organizations.

1. A minimum of 90 semester credit hours of course work beyond the bachelor’s degree.
2. Maintenance of at least a 3.0 GPA for all classes completed as a graduate student.
3. Completion of a dissertation, which incorporates independent work that is an original contribution to knowledge.
4. With approval of a student’s Faculty Advisory Committee, up to 30 credits from a master’s degree may be transferred from another institution.
5. Successful completion of comprehensive examinations in Educational Leadership and Educational Research.

6. Successful completion of a final examination.

**Educational Leadership Core Courses**

For PK-12 emphasis:

- EDL 501 Leadership and Organizational Behavior 3
- EDL 511 Effective Administrative Communications 3
- EDL 513 Leading Curriculum and Learning 3
- EDL 514 Supervision and Staff Development 3
- EDL 515 Education Law and Ethics 3
- EDL 516 Education Finance and Policy 3

**Doctoral Core Courses**

- EDL 503 Seminar Educational Leadership 1-4
- EDL 572 Educational Systems and Planning 2
- EDL 573 Administration and Organizational Behavior 3
- EDL 575 Education and Public Policy 3
- EDL 579 Special Topics in Educational Leadership 12

**Educational Leadership PK-12**

- EDL 523 The Educational Plant 3
- EDL 524 Educational Personnel Administration 2
- EDL 526 Business Management in Education 2
- EDL 527 Legal Issues in Education 3
- EDL 529 Special Education Law 3
- EDL 531 School District Leadership 2
- EDL 532 Staff and Program Evaluation 2
- EDL 571 School Community Relations 1-3

**Foundations of Education**

- EFR 500 Introduction to the Foundations of Education 3

Select one of the following:

- EFR 501 Psychological Foundations of Education
- EFR 502 Issues and Trends in Education
- EFR 503 Historical Foundations of Education
- EFR 504 Philosophical Foundations of Education
- EFR 505 Sociological Foundations of Education
- EFR 506 Multicultural Education
- EFR 507 Gender, Sexuality and Education
- EFR 508 Anthropological Foundations of Education

**Cognate Area(s)**

One or two cognate areas or one minor area outside Educational Leadership and often outside the field of Education to support the area of emphasis.

**Scholarly Tools**

Select from approved courses that provide the scholarly tools to support educational research

**Internship**

- EDL 593 Internship in Educational Leadership **1-8

**Dissertation**

- EDL 999 Dissertation 12

Total Credits 98-120

* If the Master’s degree or Specialist Diploma did not include these courses or their equivalent, they must be completed as soon as possible after admission to the Ph.D. program.

** As appropriate, elective courses are selected from one of the following areas to fulfill individual needs and goals in consultation with a student’s Faculty Advisory Committee. A minimum of 30 credits of Educational Leadership courses is required. A concentration of 48 credits in the major (including Foundations and Educational Leadership courses, scholarly tools courses and a dissertation) is required.

  - Curriculum and Instruction
  - Leadership and General Administration
  - Management of Resources

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**Master of Education in Educational Leadership**

**Admission Requirements**

1. A bachelor’s degree from an accredited college or university.
2. A cumulative undergraduate GPA of 2.75 or at least 3.00 for the last two years.
3. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.
4. Students who have completed a bachelor’s degree or higher from the United States or English-speaking Canada are not required to submit the TOEFL.
5. All applicants are required to respond to essay questions provided in the application, and submit a resume and a writing sample.
6. All PK-12 applicants are required to submit to a background check.
7. Typically, teaching experience beyond PK-12 student teaching is required.

**Degree Requirements**

1. Thirty-five to thirty-nine credits at or above the 500 level.
2. At least 12 credits, including 2 for the EDL 997 Independent Study, must be in a single field or area of concentration.
3. At least 6 credits must be in an area or areas of concentration (major).
4. At least 6 credits must be in Educational Foundations and Research.
5. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.
6. Preparation of a written, faculty approved Independent Study or successful completion of the id21 assessment.

**M.Ed. Degree (PK-12 Emphasis)**

**Required Courses**

- EDL 501 Leadership and Organizational Behavior 3
- EDL 503 Seminar Educational Leadership 1-3
- EDL 511 Effective Administrative Communications 3
- EDL 513 Leading Curriculum and Learning 3
- EDL 514 Supervision and Staff Development 3
- EDL 515 Education Law and Ethics 3
- EDL 516 Education Finance and Policy 3
- EDL 519 Internship: Curricular and Administrative Leadership 2
- EDL 529 Special Education Law 3

Select one of the following:

- EDL 520 Middle School Principal Field Study
- EDL 521 Elementary Principal Field Study
- EDL 522 Secondary Principal Field Study

Select one from the following:

- EDL 535 Administration of Elementary School Curriculum
- EDL 536 Administration of Middle School Curriculum
- EDL 537 Administration of Secondary School Curriculum
- EDL 997 Independent Study

**Research and Foundations/Cognate**

- EFR 500 Introduction to the Foundations of Education 3
- EFR 509 Introduction to Applied Educational Research 3

Total Credits 35-39
Master of Science in Educational Leadership

Admission Requirements
1. A bachelor's degree from an accredited college or university.
2. A cumulative undergraduate GPA of 2.75 or at least 3.00 for the last two years. Typically, applicants with teaching experience in schools apply to the M.Ed. program, not the M.S. program.
3. Satisfy the School of Graduate Studies' English Language Proficiency requirements as published in the Graduate Catalog.
4. Students who have received a bachelor's degree or higher from the United States or English-speaking Canada are not required to submit the TOEFL.
5. All applicants are required to respond to essay questions provided in the application; submit a resume and writing sample.

Degree Requirements
Students seeking the Master of Science degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Educational Leadership Department.
1. Thirty-seven (37) credits, including credits required for the major.
2. A minimum of two credits of Independent Study.
3. At least one-half of the credits must be at or above the 500-level.
4. A maximum of one-fourth (usually 8-9 semester credits) of the credit hours required for the degree may be transferred from another institution.
5. Preparation of a written capstone project approved by the faculty advisor.
6. Comprehensive final examination.

M.S. Degree (Higher Education Emphasis)

Required Courses
EDL 503 Seminar Educational Leadership 1
EDL 541 3
EDL 545 3
EDL 546 3
EDL 547 3
EDL 548 3
EDL 549 3
EDL 556 3
EDL 559 1
EDL 593 Internship in Educational Leadership 3
EDL 997 Independent Study 2

Total Credits 37

Research and Foundations/Cognate
EFR 500 Introduction to the Foundations of Education 3
EFR 509 Introduction to Applied Educational Research 3
T&L 541 History of Higher Education in the United States 3

Specialist Diploma in Educational Leadership

The Specialist Diploma, available at UND only in Educational Leadership, is designed for students preparing for school administrative positions. This course of study is usually considered to be a terminal program of advanced preparation for professional practice. Upon completion of the Specialist Diploma, a student generally will have completed the requirements for an administrative credential, including those required for the position of school superintendent in North Dakota.

A MINIMUM OF 64 SEMESTER HOURS OF COURSE WORK BEYOND THE BACHELOR'S DEGREE IS REQUIRED FOR THE SPECIALIST DIPLOMA. THE SPECIALIST DIPLOMA MUST INCLUDE APPROXIMATELY 30 CREDITS BEYOND THE MASTER'S DEGREE.

Teaching and Learning

Ed.D. in Educational Practice & Leadership (p. 395)
Courses

T&L 511. Assessment in ECE. 3 Credits.
This course examines the construct and practice of assessment for teaching in birth to third-grade learning environments. The course considers the critical issues related to assessment and accountability in schools, focusing on why assessment is necessary, who the various assessment audiences are, what kind of assessment information is useful for each, and the time frame appropriate for such assessment information. Students study a variety of assessment methods currently used to evaluate teaching and learning in classrooms. They also discuss ways to communicate formative information about student progress to families, collaborate with colleagues to use assessment results to modify grade-level curricula for children with diverse abilities, and advocate for culturally, linguistically, and developmentally-appropriate forms of assessment. SS.

T&L 513. Linguistics for ELL Teachers. 3 Credits.
This course introduces the complexities of human language through the study of phonetics, phonology, morphology, syntax and semantics. Additional topics addressed include the brain and language, history of the English language, psycholinguistics, writing systems and language in social contexts. SS.

T&L 514. Introduction to Multilingual Education. 3 Credits.
This course explores language education models, programs and policies with an emphasis on English language learners (ELLs). Political, legal, historical, and cultural contexts of multilingual education will be discussed with a focus on both U.S. and global challenges.

T&L 515. Middle School Curriculum. 3 Credits.
This course examines the middle school curriculum and instructional strategies as well as the needs of early adolescents. The course focuses on the roles teachers play in incorporating a guided, interdisciplinary, collaborative team approach. The studies include the components of curriculum teaching, advisory, exploration, learning communities and instruction (differentiation, cooperative learning, learning styles, instructional strategies) incorporated in middle schools.

T&L 516. Philosophy and Foundations of Middle School Education. 3 Credits.
This course examines the historical and philosophical background of middle level education. The focus is on the roles teachers/administrators play in incorporating this guided, interdisciplinary, collaborative team approach that assists students during these fundamentally transformative years. The course looks at the philosophical aspect of the curriculum and instructional component. The studies explore contemporary issues associated with the middle school as well as the adaptations necessary for special circumstances affiliated with middle schools.

T&L 517. Social Emotional Learning & Guidance. 3 Credits.
This course is designed to offer strategies for caregivers to support young children's positive social and emotional development, behavior, and learning through the exploration of how early experiences shape development. The emotional and social development of children, including the causes, expressions, prevention and management of challenging behaviors in all children birth to age eight are examined. Emphasis is placed on caregiver/family/child relationships, positive emotional/social environments, developmental implications, adverse childhood risk factors, and intervention strategies. Students will identify factors influencing emotional/social development, utilize screening measures, and design positive behavioral supports. SS.

T&L 518. Science in the Elementary School. 3 Credits.
A study of current trends and practices associated with teaching and assessing inquiry-based science in elementary classrooms.

T&L 519. Social Studies in the Elementary School. 3 Credits.
A study of current trends and practices associated with teaching and assessing social studies in elementary classrooms.

T&L 520. Curriculum and Instruction in the Elementary School. 4 Credits.
A study of processes for planning, implementing, and evaluating curriculum and improving instruction in elementary schools.

T&L 521. Differentiated Instruction. 3 Credits.
An introduction to the principles of differentiated instruction. Topics of study include: brain-based learning, responsive instructional and assessment strategies, linking curriculum standards to learner needs, organizing and managing a differentiated classroom, and relevant resources for implementation.

T&L 522. Mathematics in the Elementary School. 3 Credits.
A study of current trends and practices associated with teaching and assessing inquiry-based math in elementary classrooms.

T&L 523. Literacy Instruction for English Language Learners. 3 Credits.
This course addresses the foundations of teaching English language and literacy to English Language Learners (ELLs). Topics will include practices for reading and writing instruction, vocabulary development, assessment of reading and writing, choosing literature for ELLs, and the incorporation of media and technology in ELL literacy instruction. SS.

T&L 524. Reading in the Content Areas. 2 Credits.
How and why reading should be taught in the content areas (i.e. Social Studies, Science, Mathematics, etc.). Research studies in the field of content reading and a variety of instructional practices are reviewed.

T&L 525. Writing in the Classroom. 3 Credits.
This course examines writing as a process that is developmental, cultural, social, and individual. Emphasis is on effective implementation of the essential structures of writing workshop and on monitoring and assessing writers' growth.

T&L 526. Play in Development and Early Childhood Education. 3 Credits.
This course explores the role of play in cognitive, physical and social-emotional development, and the way in which play is incorporated into educational and other programmatic settings. Students will explore how assessment of play indicates a child's development, and they will use assessment to promote Developmentally Appropriate Practices (DAP) for PreK-Grade 3 (ages 3-8) learners.

T&L 527. Curricular Foundations in Early Childhood Education. 3 Credits.
This course examines the historical, philosophical, cultural, race, class, and gender influences on curriculum in early childhood, including the philosophy and mission of the Department of Teaching and Learning.

T&L 528. Children's and Young Adult Literature in the Classroom. 3 Credits.
This course explores the major area of literature for children and young adults in response to two questions: What is the range of literature available for children and young adults today? In what ways might children's and young adult literature be used in the classroom to promote literacy growth?. SS.

T&L 529. Language Development & Cognition in Children. 3 Credits.
This course provides foundational information about language and cognitive development in children. The course content will also analyze typical and atypical language and cognitive development. The focus of the course will include children birth to age eight.

T&L 530. Foundations of Reading Instruction. 3-4 Credits.
This course focuses on the relationship between reading theory, research, contemporary issues and instructional practice. Emphasis is placed on strategic systems related to effective reading, instructional approaches that support the development of these strategic systems and assessment as collecting evidence of effective reading behaviors.

T&L 531. Early Literacy Development and Instruction. 3 Credits.
A study of early literacy processes including phonemic and print awareness, word recognition, comprehension, and writing. Emphasis is on reviewing current research and theory, assessment and instruction practices, and bridging language and literacy development in literacy rich environments.

T&L 532. Leadership in Literacy. 3 Credits.
The role of the literacy coach is to support teachers in closing the gap between learners' performance and achievement in reading and writing. Topics in this course will include providing leadership for a school's literacy program, collaboration with teachers and administrators, curriculum issues, knowledge of literacy standards, and professional development facilitation. On demand.
T&L 533. Secondary English Language Arts & Literacy Instruction. 3 Credits.
This graduate level course explores teaching literacy in the English Language Arts middle and high school classroom. Students will explore how the traditional and contemporary approaches to teaching literature, nonfiction, and digital media work to support the advanced literacy goals of reading, writing, listening and speaking for adolescents. Students will explore Language Arts instructional methods and develop curriculum in the areas of literature, writer's workshop, academic inquiry, language vocabulary, and digital literacy. Students will also explore the ways the literacy program is supported and assessed throughout the entire secondary school. SS.

T&L 534. Basic Reading Diagnosis and Remediation. 2 Credits.
Focuses on common causes of reading disability, methods of diagnosis, and corrective reading programs in the classroom. Corequisite: T&L 533.

T&L 535. Advanced Reading/Language Arts Diagnosis and Remediation. 2 Credits.
Analysis of interrelationships of learning difficulties in language arts areas and procedures for remediation. Prerequisites: T&L 530 and T&L 534.

T&L 536. Innovations in English Language Arts Instruction. 3 Credits.
This course considers the current curricular trends and research-based best practices in teaching English Language Arts. Students will critically examine and apply current instructional approaches in teaching English language and vocabulary, classroom discourse practices, and digital literacies. We will consider the ways various instructional methods support the advancement of literacy development for all students, considering ways to modify and adapt curriculum to meet the cultural and linguistic diversity of today’s classrooms. On demand.

T&L 537. ELL Methods and Materials. 3 Credits.
This course explores current methods and materials in ELL education, with a focus on teaching academic language and sheltered content instruction. F.S.SS.

T&L 538. Supervision of Student Teaching. 2 Credits.
For supervisors and directors of student teaching in colleges and cooperating schools. Principles and practices on how to provide the most beneficial experiences for student teachers.

T&L 539. College Teaching. 3 Credits.
Explores learning styles and teaching styles, the components and responsibilities involved in college teaching, methods of teaching and motivating students, and current issues related to instruction in the college classroom.

T&L 540. Theory and Philosophies of Curriculum in Schools. 3 Credits.
This course explores the historical development of the K-12 curriculum, the philosophical and theoretical aspects applied to curriculum, and the social conditions that impact curriculum.

T&L 541. History of Higher Education in the United States. 3 Credits.
Study of major events and people shaping higher education in the U.S. Role, philosophy, and organization of institutions of higher education discussed.

T&L 542. Models of Teaching. 3 Credits.
This course focuses on various models of teaching: social interaction, information-processing, inquiry and behavioral. The purpose of the course is to provide teachers with a variety of instructional models related to meaningful learning experiences for students.

T&L 543. Scholarly Writing. 3 Credits.
Designed to assist students with learning the art of scholarly writing, this course will aid students in designing, formatting, and completing research-based and other scholarly writing projects, as well as understanding the rules and norms of academic publishing.

T&L 544. Assessment in Higher Education. 3 Credits.
A wide range of assessment issues in higher education will be explored. This includes course, program, and institutional assessment as well as classroom assessment techniques. Students will examine and understand the assessment process.

T&L 545. Adult Learners. 3 Credits.
This course will cover theories of adult development, current research on adult learners, ways of assessing the needs and interests of adult learners, and ways of creating environments in which adult learners can thrive.

T&L 546. College Students with Special Needs. 3 Credits.
This course explores the range of special needs college students bring to campus and how faculty, staff, and administrators might appropriately meet those needs. Prerequisite: Admission to the School of Graduate Studies or instructor permission. S.

T&L 547. Technology in Higher Education. 3 Credits.
Students will examine the various uses and integration of technology and media in higher education by faculty in their attempt to engage learners with each other, the course content, and with instructors.

T&L 548. The Professoriate. 3 Credits.
This course is a study of the development of the American professoriate by way of historical, scholarly, popular, and contemporary perspectives. It also examines the transition of new faculty members to their initial academic appointment.

T&L 549. Seminar. 1-4 Credits.
The seminar will focus on a specific topic relating to teaching and learning. The specific content will vary depending upon student needs and faculty resources. Repeatable. S/U grading.

T&L 550. Assessment and Evaluation in ELL Education. 3 Credits.
This course combines readings and theoretical discussion of assessment with hands-on experience in assessing ELLs. Students will learn how to use a variety of formal and informal assessments with a focus on how to use assessment data in planning instruction. Topics will include classroom-based assessments, language proficiency testing, testing accommodations for ELLs, and assessment of ELLs for special education and gifted education; and ELL program evaluation.

T&L 551. Second Language Acquisition for ELL Teachers. 3 Credits.
This course will explore the socio- and psycho-linguistic aspects of interlanguage by studying the theories and research of first and second language acquisition. Students will examine the nature of learners and their individual differences during the stages of language development, with a focus on children and K-12 classrooms.

T&L 553. Collaborative Relationships: Home, School and Community. 3 Credits.
A course appropriate for anyone working with families, early childhood educators, general educators, special educators, related service personnel, administrators and outside agency personnel. Topics covered include: (1) the various models of collaboration and consultation and the stages of each; (2) communication skills; (3) problem-solving; (4) conflict management; (5) diverse perspectives; (6) information collection procedures; (7) supervisory skills; (8) family characteristics and structure across the lifespan; (9) family focused intervention; (10) school choices; and (11) school issues such as poverty, domestic violence, teasing, bullying, and school violence.

T&L 558. Middle School Science and Engineering Lab1:Solids. 2 Credits.
T&L 559A. MS Sci.Eng-2: Solids. 3 Credits.
Prerequisites: T&L 558, admission to Graduate School, ND Teacher licensure and Admission to program "Improving Math and Science Literacy of Middle and High School Students of North Dakota Through Teacher-Faculty Partnerships".

T&L 559B. MS Sci.Eng-2: Solids. 3 Credits.
Prerequisites: T&L 558, admission to Graduate School, ND Teacher licensure and Admission to program "Improving Math and Science Literacy of Middle and High School Students of North Dakota Through Teacher-Faculty Partnerships".

T&L 566. Brain in Memory and Learning. 3 Credits.
Prerequisite: Admissions to Grad School.

T&L 567. Language Structure and Analysis for ELL Teachers. 3 Credits.
This course explores the grammatical and discourse structures of the modern English language, analysis of grammar and discourse with a focus on specific problem areas for ELLs, and pedagogical implications for English language development.

T&L 568. Research and Advocacy in TESOL. 3 Credits.
This course prepares teachers to both understand and conduct research in TESOL. Emphasis will be placed on using research data to advocate for changes and improvement in ELL education.

T&L 569. Action Research. 3 Credits.
The study of the philosophy and methods of action research. Emphasis is focused on analysis of and reflection on one's teaching for the purpose of improvements in student learning. Prerequisite: Graduate status. S.
T&L 571. Teacher Education. 3 Credits.
Practices, issues, and trends in the design and implementation and assessment of programs for the preparation and development of K-12 teachers.

T&L 572. Teacher Education: Focus on the Learner. 3 Credits.
The study of teacher education in relation to the lives of P-12 students. This course includes the examination of children and their lives through aspects of race, religion, socioeconomic, linguistics and age, and considers educational implications for preservice and inservice teachers.

T&L 573. Middle School Science and Engineering Lab2: Lig/Gas. 2 Credits.

T&L 574. MS Sci.Eng.-4: Liquid/Gas. 3 Credits.
Prerequisites: T&L 573, admission to Graduate School, ND Teacher licensure and Admission to program "Improving Math and Science Literacy of Middle and High School Students of North Dakota Through Teacher-Faculty Partnerships".

T&L 575. Middle School Science and Engineering Lab3: Mot/Elec. 2 Credits.

T&L 576A. MS Sci.Eng.-6: Motion/Electric. 3 Credits.
Prerequisites: T&L 576A.

T&L 576B. MS Sci.Eng.-6: Motion/Electric. 3 Credits.
Prerequisites: T&L 576A.

T&L 577. Assessment of Learning. 3 Credits.
This course addresses the theory and practice of assessment, specifically the process of gathering and discussing information from multiple and diverse sources in order to develop a deep understanding of what students know, understand, and can do with their knowledge as a result of educational experiences.

T&L 579. Classroom Based Inquiry. 3 Credits.
Concepts learned in T&L 569 will be looked at in-depth and theoretical constructs such as Living Theory, Self Study, and Critical Theory constructs will be studied. Students plan and conduct an in-depth inquiry project within a school setting, complete the associated IRB, and create and academic poster and/or prepare a proposal of the Inquiry project for a professional setting.
Prerequisites: T&L 569; or by permission of instructor. F.S.

T&L 580. Practicum in Schools. 1-4 Credits.
Practicum in study of desirable school practices, observations in nearby schools, and application of research findings in solving practical problems.
Prerequisites: Appropriate foundational and major area courses, and consent of the instructor and advisor. Repeatable.

T&L 581. Resident Internship. 4 Credits.
A full-time, year-long internship experience conducted in a cooperating school district. Interns are assigned as members of instructional teams with full responsibility for a portion of the cooperating school's instructional program.
Prerequisites: Participation in the summer program prior to the internship and teaching licensure (see dept for approval).

T&L 582. Resident Internship. 4 Credits.
A full-time, year-long internship experience conducted in a cooperating school district. Interns are assigned as members of instructional teams with full responsibility for a portion of the cooperating school's instructional program.
Prerequisites: Participation in the summer program prior to the internship and teaching licensure (see dept for approval).

T&L 583. Reading Clinic. 2 Credits.

T&L 584. Internship in Education. 1-8 Credits.
This is a culminating experience primarily for Sixth year and Doctoral students. The internships will be identified in one of the following sub-areas: (A) Educational Administration, (B) Special Education, (C) Curriculum, (D) Educational Research, or (E) Teacher Education. Prerequisites: Appropriate foundational, cognate, and major area coursework and consent of advisor and instructor. Repeatable.

T&L 589. Professional Development: Resident Teacher Program. 2 Credits.
This field-based experience provides mentoring and coaching, translates baccalaureate theory and research into practice, and requires active participation in the school placement and classroom setting. Issues and topics relevant to first year teachers and graduate education are emphasized through field work and discussions. Prerequisite: Admission into the Elementary Education Resident Teacher Program. SS.

T&L 590. Special Topics. 1-4 Credits.
Exploration of special topics in the study of education not regularly included in available course offerings. May be repeated for different topics. Prerequisite: Consent of instructor or advisor. Repeatable.

T&L 591. Readings in Education. 1-4 Credits.
Designed primarily for advanced graduate students. May be repeated for different topics. Prerequisite: Consent of instructor and advisor. Repeatable.

T&L 593. Independent Projects. 1-4 Credits.
Repeatable.

T&L 596. Individual Research in Education. 1-4 Credits.
Prerequisite: Consent of instructor and advisor. Repeatable.

T&L 995. Scholarly Project. 2 Credits.
The scholarly project demonstrates critical analysis and application of information and experiences gained throughout the program of study. The project allows students to demonstrate scholarly skills in an integrated manner that is directly related to their roles as teachers, program evaluators, and action researchers. The scholarly project must be approved by the student's adviser.

T&L 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

T&L 997. Independent Study. 2 Credits.

T&L 998. Thesis. 1-9 Credits.
Repeatable to 9 credits.

T&L 999. Dissertation. 1-15 Credits.
Repeatable to 15 credits.

Undergraduate Courses for Graduate Credit

T&L 322. Administration and Leadership in Early Childhood Education. 3 Credits.
An investigation of patterns of administration, curriculum organization, spatial resources, and staffing in early childhood settings, serving children 0-8 years old. Topics include federal and state laws and emerging trends in preschool and primary education in the state, region, and nation. Sixteen (16) hours of field experience. Prerequisite: Admission to the Teacher Education program. S.

T&L 422. Development of the Gifted and Talented. 2 Credits.
Research and theory for understanding the development needs of the more able child in early childhood and in educational experiences. S.

T&L 423. Assessment and Individualized Planning in Special Education. 3 Credits.
A study of the principles and practices of: (1) obtaining diagnostic information on school-related problems of a student; (2) assimilating this information and prescribing appropriate alterations based on continuous measurement data. Prerequisites or Corequisites: T&L 315 and T&L 319. F.S.

T&L 493. Workshop. 1-4 Credits.
Special problems in Special Education; consideration of special problems of concern to the Special Education teacher and other educators. Repeatable to 8 credits. F.S.

Doctor of Education in Educational Practice and Leadership

Admission Requirements:
The following criteria will be used to assess a student’s application for admission into the Doctor of Education in Educational Practice and Leadership program. No single criterion can adequately predict a student’s probable success in graduate work. Applicants should anticipate that the materials they submit will be held to high standards with submission of the following:

1. The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.
2. Completion of a master’s degree from an accredited college or university
3. Grade point average from all previous graduate work (minimum of 3.5 required)
4. Professional resume.
5. Transcripts.
6. Three letters of recommendation that address your academic ability, professional accomplishments related to your field of study, and positive character traits.

7. A statement of clear professional/educational goals that can be met by this program/specialization as specified in the graduate catalog.

8. Essay. An original essay not to exceed four double-spaced pages (exclusive of references) on a contemporary problem of practice. The writing will be reviewed for:
   a. overall suitability for doctoral level study;
   b. cohesive development of ideas;
   c. support for ideas; and
   d. writing conventions.

9. Writing sample.
   a. Include with your application an individually-authored sample of your writing that the admission committee can use to evaluate your ability as a writer and potential success in the doctoral program.
   b. The minimum length of the sample is five pages and should not exceed 30 pages. Examples of possible writing samples include, but are not limited to, journal articles, paper from a course, or some written work product such as a manual or technical report.

10. The applicant must sign a statement attesting that the goal statement, essay, and writing sample submitted were original compositions of the applicant, completed without the aid of an editor.

11. Applicants for the School Leadership specialization are required to have a teaching credential, three years of teaching experience, and leadership experience in PK-12 environments and pass a background check.

Degree Requirements:

1. A minimum of 90 semester credit hours of course work beyond the bachelor’s degree.

2. Maintenance of at least a 3.0 GPA for all classes completed as a graduate student.

3. With approval of a student’s Faculty Advisory Committee, up to 30 credits from a master’s degree may be transferred from another institution.

4. Successful completion of comprehensive examinations.

5. Completion of a Dissertation in Practice (9 credits).

6. Ed.D. Core Coursework (9 credits):
   - EFR 502 Issues and Trends in Education 3
   - HE 569 Diversity Systems and Policy in Education 3
   - EDL 573 Administration and Organizational Behavior 3

7. Scholarly Tools Coursework (9 credits):
   - EFR 509 Introduction to Applied Educational Research 3
   - Select 2 Additional Courses (6 credits)
   - T&L 569 Action Research 3
   - T&L 579 Classroom Based Inquiry 3
   - EFR 511 Program Evaluation 3
   - EFR 530 Learning Analytics 3

8. In addition, you may choose one or more specialization areas and complete the required courses. Elective credits can be selected from graduate courses in other specializations and from the Educational Foundations and Research (EFR) program in consultation with academic advisor.

Descriptions of Specializations:

- **Higher Education (HE):** The HE area prepares administrators and/or professors for leadership in an academic discipline at a college or university.

- **School Leadership (SL):** The SL area is designed primarily for the practitioners preparing for school administration positions including elementary, middle school, and secondary principals; superintendents; curriculum directors, and other school district central office positions. Upon completion of the degree, depending on state licensure credential requirements, a student generally will have completed many, if not all, coursework which will lead to an administrative credential.

- **Special Education (SPED):** The SPED area is focused on preparing experienced professionals for the role as an Educational Diagnostician. Diagnosticians evaluate students to determine services and effective programming, as well as provide leadership at the school and district levels to inform policies and practices.

- **Teacher Education (TE):** The TE area prepares professors of education at a college or university and/or as an educational specialist to teachers in PK-12 schools.

**Higher Education**

*Higher Education Required Courses (15 credits)*

- HE 532 Principles and Practices in Higher Education 3
- HE 536 Leading and Learning in Higher Education 3
- T&L 541 History of Higher Education in the United States 3
- T&L 544 Assessment in Higher Education 3
- T&L 545 Adult Learners 3

*Higher Education Elective Courses (18 credits)*

- HE 538 College Student Experiences 3
- HE 561 Curriculum in Higher Education 3
- HE 563 Academic Administration in Higher Education 3
- HE 564 Higher Education Student and Support Services 3
- HE 570 Higher Education Law 3
- HE 573 Higher Education and Public Policy 3
- HE 576 Higher Education Planning and Finance 3
- T&L 539 College Teaching 3
- T&L 543 Scholarly Writing 3
- T&L 548 The Professoriate 3
- T&L 547 Technology in Higher Education 3

Elective credits can be selected from graduate courses in other specializations and from the Educational Foundations and Research (EFR) program in consultation with academic advisor.

**School Leadership**

*School Leadership Required Courses (18-25 credits)*

- EDL 524 Educational Personnel Administration 2
- EDL 526 Business Management in Education 2
- EDL 527 Legal Issues in Education 3
- EDL 531 School District Leadership 2
- EDL 532 Staff and Program Evaluation 2
- EDL 575 Education and Public Policy 3
- EDL 579 Special Topics in Educational Leadership 1-4
- EDL 593 Internship in Educational Leadership 1-8

Elective credits can be selected from graduate courses in other specializations and from the Educational Foundations and Research (EFR) program in consultation with academic advisor.

**Special Education**

*Special Education Required Courses (32 credits)*

- SPED 521 Transition to Adult Life 3
- SPED 525 Legal/Ethical Aspects in Special Education 3
- SPED 544 Research Methods in Behavior Analysis 3
- SPED 557 Progress Monitoring 3
- SPED 570 The Educational Diagnostician 3
- SPED 571 Social, Emotional, and Behavioral Assessment Measures in Special Education 3
SPED 572  Achievement Assessment Measures in Special Education  3
SPED 582  Internship: Educational Diagnostician  1-4
T&L 529  Language Development & Cognition in Children  3
COUN 570  Language Assessment Measures in Special Education  3

Special Education Elective Courses: These courses will be selected based on previous coursework to meet Council for Exceptional Children’s advanced standards; thus transcript reviews will be conducted.

SPED 511  Identification and Assessment of Young Children with Special Needs  3
SPED 523  Assessment in Gifted/Talented Education  3
SPED 551  Advanced Assessment in Special Education  3
SPED 567  Assessment in Autism Spectrum Disorder  3
SPED 558  Multi-Tier System of Supports  2
SPED 578  Behavior Management  3
T&L 534  Basic Reading Diagnosis and Remediation  2
T&L 583  Reading Clinic  2
T&L 535  Advanced Reading/Language Arts Diagnosis and Remediation  2
T&L 550  Assessment and Evaluation in ELL Education  3

Teacher Education

Teacher Education Required Courses (21 credits)

T&L 539  College Teaching  3
T&L 544  Assessment in Higher Education  3
T&L 545  Adult Learners  3
T&L 548  The Professoriate  3
T&L 571  Teacher Education  3
T&L 572  Teacher Education: Focus on the Learner  3
EFR 506  Multicultural Education  3

Elective credits can be selected from graduate courses in other specializations and from the Educational Foundations and Research (EFR) program in consultation with advisor.

Doctor of Philosophy in Teaching and Learning

Admission Requirements

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

Applicants should anticipate that the materials they submit will be held to high standards with the following basic expectations:

1. Graduate grade point average of 3.5 and above
2. Excellent writing skills
3. Three letters of recommendation that address your academic ability, professional accomplishments related to your field of study, and positive character traits
4. A statement of clear professional/educational goals that can be met by your program as specified in the graduate catalog

Your application must also include the following:

1. Transcripts
2. Professional resume
3. Essay. An original essay not to exceed four double-spaced pages (exclusive of references) on a controversial issue or a problem facing education today. The writing will be reviewed for:
   a. overall suitability for doctoral level study;
   b. cohesive development of ideas;
   c. support for ideas; and
   d. writing conventions. The applicant must also sign a statement attesting that the work submitted was that of the applicant.
4. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

Students with a master’s degree in the content field and without previous background in the study of education are eligible for admission to the Ph.D. program with the higher education area of emphasis option.

Degree Requirements

Students seeking the Doctor of Philosophy degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Teaching and Learning Department.

1. Completion of 90 semester credits beyond the baccalaureate degree
2. Maintenance of at least a 3.0 GPA for all classes completed as a graduate student.
3. With approval of a student’s Faculty Advisory Committee, up to one-half of the work beyond a master’s degree (maximum of 30 semester credit hours) may be transferred from another institution that offers post-master’s degrees in the discipline.
4. At least one-half of the work must be in the major field, including:
   • At least 10 credits of dissertation, which incorporates independent work that is an original contribution to knowledge in the field
   • A minimum of 6 credits in the Foundations of Education
   • A minimum of 12 credits of scholarly tools*
   • At least 12 credits of a minor or cognate in a supporting area
5. Meet one of the three residency options described below.

Residency Requirements for Doctoral Programs

The purpose of residency is to provide an opportunity for sustained and concentrated intellectual effort, to provide for immersion in a research environment, and to permit extensive interaction with fellow students and faculty of the major department.

The residency for programs in education is designed to provide the student with the experiences outlined by the School of Graduate Studies. It is expected that students will engage in serious scholarship and will reflect on their learning and experiences. The expectation is that the students will integrate their doctoral study in order that the program of study they pursue will become a holistic and unified experience. (The residency option is normally declared on the student’s program of study.) The education faculty has outlined some of the conditions required for these goals to be realized. A doctoral student in Teaching and Learning can meet the residency requirement in any one of these ways:

• Students will complete a residency while enrolled in a minimum of 9 semester hours of credit during each of two consecutive semesters (Fall, Spring or Spring, Fall). Students in this option are encouraged, but are not required, to enroll in a Doctoral Seminar during their residency or at another time in the program. If a student is a GRA, GSA, or GTA, the number of credits that the student may take for this option is less and specified in the catalog.
• Students will complete a residency while enrolled in a minimum of eight semester hours of credit during each of three consecutive summer sessions and in a minimum of two Doctoral Seminars following their first and second or third summers in residence.
• Students will complete a residency over a period of three consecutive years of continuous enrollment in a minimum of 36 semester hours of credit (12 credits per year for 3 years) to include a minimum of two Doctoral Seminars during the period of residency.

Curriculum and Instruction

M.S. in Curriculum & Instruction (p. 400)
Courses

T&L 511. Assessment in ECE. 3 Credits.
This course examines the construct and practice of assessment for teaching in birth to third-grade learning environments. The course considers the critical issues related to assessment and accountability in schools, focusing on why assessment is necessary, who the various assessment audiences are, what kind of assessment information is useful for each, and the time frame appropriate for such assessment information. Students study a variety of assessment methods currently used to evaluate teaching and learning in classrooms. They also discuss ways to communicate formative information about student progress to families, collaborate with colleagues to use assessment results to modify grade-level curricula for children with diverse abilities, and advocate for culturally, linguistically, and developmentally-appropriate forms of assessment. SS.

T&L 513. Linguistics for ELL Teachers. 3 Credits.
This course introduces the complexities of human language through the study of phonetics, phonology, morphology, syntax and semantics. Additional topics addressed include the brain and language, history of the English language, psycholinguistics, writing systems and language in social contexts. SS.

T&L 514. Introduction to Multilingual Education. 3 Credits.
This course explores language education models, programs and policies with an emphasis on English language learners (ELLs). Political, legal, historical, and cultural contexts of multilingual education will be discussed with a focus on both U.S. and global challenges.

T&L 515. Middle School Curriculum. 3 Credits.
This course examines the middle school curriculum and instructional strategies as well as the needs of early adolescents. The course focuses on the roles teachers play in incorporating a guided, interdisciplinary, collaborative team approach. The studies include the components of curriculum teaming, advisory, exploration, learning communities and instruction (differentiation, cooperative learning, learning styles, instructional strategies) incorporated in middle schools.

T&L 516. Philosophy and Foundations of Middle School Education. 3 Credits.
This course examines the historical and philosophical background of middle level education. The focus is on the roles teachers/administrators play in incorporating this guided, interdisciplinary, collaborative team approach that assists students during these fundamentally transformative years. The course looks at the philosophical aspect of the curriculum and instructional component. The studies explore contemporary issues associated with the middle school as well as the adaptations necessary for special circumstances affiliated with middle schools.

T&L 517. Social Emotional Learning & Guidance. 3 Credits.
This course is designed to offer strategies for caregivers to support young children’s positive social and emotional development, behavior, and learning through the exploration of how early experiences shape development. The emotional and social development of children, including the causes, expressions, prevention and management of challenging behaviors in all children birth to age eight are examined. Emphasis is placed on caregiver/family/child relationships, positive emotional/social environments, developmental implications, adverse childhood risk factors, and intervention strategies. Students will identify factors influencing emotional/social development, utilize screening measures, and design positive behavioral supports. SS.

T&L 518. Science in the Elementary School. 3 Credits.
A study of current trends and practices associated with teaching and assessing inquiry-based science in elementary classrooms.

T&L 519. Social Studies in the Elementary School. 3 Credits.
A study of current trends and practices associated with teaching and assessing social studies in elementary classrooms.

T&L 520. Curriculum and Instruction in the Elementary School. 4 Credits.
A study of processes for planning, implementing, and evaluating curriculum and improving instruction in elementary schools.

T&L 521. Differentiated Instruction. 3 Credits.
An introduction to the principles of differentiated instruction. Topics of study include: brain-based learning, responsive instructional and assessment strategies, linking curriculum standards to learner needs, organizing and managing a differentiated classroom, and relevant resources for implementation.

T&L 522. Mathematics in the Elementary School. 3 Credits.
A study of current trends and practices associated with teaching and assessing inquiry-based math in elementary classrooms.

T&L 523. Literacy Instruction for English Language Learners. 3 Credits.
This course addresses the foundations of teaching English language and literacy to English Language Learners (ELLs). Topics will include practices for reading and writing instruction, vocabulary development, assessment of reading and writing, choosing literature for ELLs, and the incorporation of media and technology in ELL literacy instruction. SS.

T&L 524. Reading in the Content Areas. 2 Credits.
How and why reading should be taught in the content areas (i.e. Social Studies, Science, Mathematics, etc.). Research studies in the field of content reading and a variety of instructional practices are reviewed.

T&L 525. Writing in the Classroom. 3 Credits.
This course examines writing as a process that is developmental, cultural, social, and individual. Emphasis is on effective implementation of the essential structures of writing workshop and on monitoring and assessing writers’ growth.

T&L 526. Play in Development and Early Childhood Education. 3 Credits.
This course explores the role of play in cognitive, physical and social-emotional development, and the way in which play is incorporated into educational and other programmatic settings. Students will explore how assessment of play indicates a child's development, and they will use assessment to promote Developmentally Appropriate Practices (DAP) for PreK-Grade 3 (ages 3-8) learners.

T&L 527. Curricular Foundations in Early Childhood Education. 3 Credits.
This course examines the historical, philosophical, cultural, race, class, and gender influences on curriculum in early childhood, including the philosophy and mission of the Department of Teaching and Learning.

T&L 528. Children’s and Young Adult Literature in the Classroom. 3 Credits.
This course explores the major area of literature for children and young adults in response to two questions: What is the range of literature available for children and young adults today? In what ways might children’s and young adult literature be used in the classroom to promote literacy growth? SS.

T&L 529. Language Development & Cognition in Children. 3 Credits.
This course provides foundational information about language and cognitive development in children. The course content will also analyze typical and atypical language and cognitive development. The focus of the course will include children birth to age eight.

T&L 530. Foundations of Reading Instruction. 3-4 Credits.
This course focuses on the relationship between reading theory, research, contemporary issues and instructional practice. Emphasis is placed on strategic systems related to effective reading, instructional approaches that support the development of these strategic systems and assessment as collecting evidence of effective reading behaviors.

T&L 531. Early Literacy Development and Instruction. 3 Credits.
A study of early literacy processes including phonemic and print awareness, word recognition, comprehension, and writing. Emphasis is on reviewing current research and theory, assessment and instruction practices, and bridging language and literacy development in literacy rich environments.

T&L 532. Leadership in Literacy. 3 Credits.
The role of the literacy coach is to support teachers in closing the gap between learners’ performance and achievement in reading and writing. Topics in this course will include providing leadership for a school's literacy program, collaboration with teachers and administrators, curriculum issues, knowledge of literacy standards, and professional development facilitation. On demand.

T&L 533. Secondary English Language Arts & Literacy Instruction. 3 Credits.
This graduate level course explores teaching literacy in the English Language Arts middle and high school classroom. Students will explore how the traditional and contemporary approaches to teaching literature, nonfiction, and digital media work to support the advanced literacy goals of reading, writing, listening and speaking for adolescents. Students will explore Language Arts instructional methods and develop curriculum in the areas of literature, writer's workshop, academic inquiry, language vocabulary, and digital literacy. Students will also explore the ways the literacy program is supported and assessed throughout the entire secondary school. SS.

T&L 534. Basic Reading Diagnosis and Remediation. 2 Credits.
Focuses on common causes of reading disability, methods of diagnosis, and corrective reading programs in the classroom. Corequisite: T&L 583.
T&L 535. Advanced Reading/Language Arts Diagnosis and Remediation. 2 Credits.
Analysis of interrelationships of learning difficulties in language arts areas and procedures for remediation. Prerequisites: T&L 530 and T&L 534.

T&L 536. Innovations in English Language Arts Instruction. 3 Credits.
This course considers the current curricular trends and research-based best practices in teaching English Language Arts. Students will critically examine and apply current instructional approaches in teaching English language and vocabulary, classroom discourse practices, and digital literacies. We will consider the ways various instructional methods support the advancement of literacy development for all students, considering ways to modify and adapt curriculum to meet the cultural and linguistic diversity of today's classrooms. On demand.

T&L 537. ELL Methods and Materials. 3 Credits.
This course explores current methods and materials in ELL education, with a focus on teaching academic language and sheltered content instruction.

F,S,SS.

T&L 538. Supervision of Student Teaching. 2 Credits.
For supervisors and directors of student teaching in colleges and cooperating schools. Principles and practices on how to provide the most beneficial experiences for student teachers.

T&L 539. College Teaching. 3 Credits.
Explores learning styles and teaching styles, the components and responsibilities involved in college teaching, methods of teaching and motivating students, and current issues related to instruction in the college classroom.

T&L 540. Theory and Philosophies of Curriculum in Schools. 3 Credits.
This course explores the historical development of the K-12 curriculum, the philosophical and theoretical aspects applied to curriculum, and the social conditions that impact curriculum.

T&L 541. History of Higher Education in the United States. 3 Credits.
Study of major events and people shaping higher education in the U.S. Role, philosophy, and organization of institutions of higher education discussed.

T&L 542. Models of Teaching. 3 Credits.
This course focuses on various models of teaching: social interaction, information-processing, inquiry and behavioral. The purpose of the course is to provide teachers with a variety of instructional models related to meaningful learning experiences for students.

T&L 543. Scholarly Writing. 3 Credits.
Designed to assist students with learning the art of scholarly writing, this course will aid students in designing, formatting, and completing research-based and other scholarly writing projects, as well as understanding the rules and norms of academic publishing.

T&L 544. Assessment in Higher Education. 3 Credits.
A wide range of assessment issues in higher education will be explored. This includes course, program, and institutional assessment as well as classroom assessment techniques. Students will examine and understand the assessment process.

T&L 545. Adult Learners. 3 Credits.
This course will cover theories of adult development, current research on adult learners, ways of assessing the needs and interests of adult learners, and ways of creating environments in which adult learners can thrive.

T&L 546. College Students with Special Needs. 3 Credits.
This course explores the range of special needs college students bring to campus and how faculty, staff, and administrators might appropriately meet those needs. Prerequisite: Admission to the School of Graduate Studies or instructor permission.

T&L 547. Technology in Higher Education. 3 Credits.
Students will examine the various uses and integration of technology and media in higher education by faculty in their attempt to engage learners with each other, the course content, and with instructors.

T&L 548. The Professoriate. 3 Credits.
This course is a study of the development of the American professoriate by way of historical, scholarly, popular, and contemporary perspectives. It also examines the transition of new faculty members to their initial academic appointment.

T&L 549. Seminar. 1-4 Credits.
The seminar will focus on a specific topic relating to teaching and learning. The specific content will vary depending upon student needs and faculty resources. Repeatable. S/U grading.

T&L 550. Assessment and Evaluation in ELL Education. 3 Credits.
This course combines readings and theoretical discussion of assessment with hands-on experience in assessing ELLs. Students will learn how to use a variety of formal and informal assessments with a focus on how to use assessment data in planning instruction. Topics will include classroom-based assessments, language proficiency testing, testing accommodations for ELLs, and assessment of ELLs for special education and gifted education, and ELL program evaluation.

T&L 551. Second Language Acquisition for ELL Teachers. 3 Credits.
This course will explore the socio- and psycho-linguistic aspects of interlanguage by studying the theories and research of first and second language acquisition. Students will examine the nature of learners and their individual differences during the stages of language development, with a focus on children and K-12 classrooms.

T&L 553. Collaborative Relationships: Home, School and Community. 3 Credits.
A course appropriate for anyone working with families, early childhood educators, general educators, special educators, related service personnel, administrators and outside agency personnel. Topics covered include: (1) the various models of collaboration and consultation and the stages of each; (2) communication skills; (3) problem-solving; (4) conflict management; (5) diverse perspectives; (6) information collection procedures; (7) supervisory skills; (8) family characteristics and structure across the lifespan; (9) family focused interventions; (10) school choices; and (11) school issues such as poverty, domestic violence, teasing, bullying, and school violence.

T&L 554. Assessment in ELL Education. 3 Credits.
Repeatable. S/U grading.

T&L 555A. MS Sci.Eng-2: Solids. 3 Credits.
Prerequisites: T&L 558, admission to Graduate School, ND Teacher licensure and Admission to program "Improving Math and Science Literacy of Middle and High School Students of North Dakota Through Teacher-Faculty Partnerships".

T&L 555B. MS Sci.Eng-2: Solids. 3 Credits.
Prerequisites: T&L 558, admission to Graduate School, ND Teacher licensure and Admission to program "Improving Math and Science Literacy of Middle and High School Students of North Dakota Through Teacher-Faculty Partnerships".

T&L 556. Brain in Memory and Learning. 3 Credits.
Prerequisite: Admissions to Grad School.

T&L 557. Language Structure and Analysis for ELL Teachers. 3 Credits.
This course explores the grammatical and discourse structures of the modern English language, analysis of grammar and discourse with a focus on specific problem areas for ELLs, and pedagogical implications for English language development.

T&L 558. Research and Advocacy in TESOL. 3 Credits.
This course prepares teachers to both understand and conduct research in TESOL. Emphasis will be placed on using research data to advocate for changes and improvement in ELL education.

T&L 559. Action Research. 3 Credits.
The study of the philosophy and methods of action research. Emphasis is focused on analysis of and reflection on one's teaching for the purpose of improvements in student learning. Prerequisite: Graduate status. S.

T&L 571. Teacher Education. 3 Credits.
Practices, issues, and trends in the design and implementation and assessment of programs for the preparation and development of K-12 teachers.

T&L 572. Teacher Education: Focus on the Learner. 3 Credits.
The study of teacher education in relation to the lives of P-12 students. This course includes the examination of children and their lives through aspects of race, religion, socioeconomic, linguistics and age, and considers educational implications for preservice and inservice teachers.

T&L 573. Middle School Science and Engineering Lab2:Liq/Gas. 2 Credits.

T&L 574. MS Sci.Eng-4: Liquid/Gas. 3 Credits.
Prerequisites: T&L 573, admission to Graduate School, ND Teacher licensure and Admission to program "Improving Math and Science Literacy of Middle and High School Students of North Dakota Through Teacher-Faculty Partnerships".
T&L 575. Middle School Science and Engineering Lab3:Mot/Elec. 2 Credits.
T&L 575A. MS Sci.Eng.-6:Motion/Electric. 3 Credits.
Prerequisites: T&L 575, admission to Graduate School, ND Teacher Licensure and employment as a teacher in a ND school.
T&L 575B. MS Sci.Eng.-6:Motion/Electric. 3 Credits.
Prerequisite: T&L 575A.
T&L 577. Assessment of Learning. 3 Credits.
This course addresses the theory and practice of assessment, specifically the process of gathering and discussing information from multiple and diverse sources in order to develop a deep understanding of what students know, understand, and can do with their knowledge as a result of educational experiences.
T&L 579. Classroom Based Inquiry. 3 Credits.
Concepts learned in T&L 569 will be looked at in-depth and theoretical constructs such as Living Theory, Self Study, and Critical Theory constructs will be studied. Students plan and conduct an in-depth inquiry project within a school setting, complete the associated IRB, and create academic poster and/or prepare a proposal of the Inquiry project for a professional setting. Prerequisites: TL graduate status and T&L 569; or by permission of instructor. F.S.
T&L 580. Practicum in Schools. 1-4 Credits.
Practicum in study of desirable school practices, observations in nearby schools, and application of research findings in solving practical problems. Prerequisites: Appropriate foundational and major area courses, and consent of the instructor and advisor. Repeatable.
T&L 581. Resident Internship. 4 Credits.
A full-time, year-long internship experience conducted in a cooperating school district. Interns are assigned as members of instructional teams with full responsibility for a portion of the cooperating school's instructional program. Prerequisites: Participation in the summer program prior to the internship and teaching licensure (see dept for approval).
T&L 582. Resident Internship. 4 Credits.
A full-time, year-long internship experience conducted in a cooperating school district. Interns are assigned as members of instructional teams with full responsibility for a portion of the cooperating school's instructional program. Prerequisites: Participation in the summer program prior to the internship and teaching licensure (see dept for approval).
T&L 583. Reading Clinic. 2 Credits.
T&L 584. Internship in Education. 1-8 Credits.
This is a culminating experience primarily for Sixth year and Doctoral students. The internships will be identified in one of the following sub-areas: (A) Educational Administration, (B) Special Education, (C) Curriculum, (D) Educational Research, or (E) Teacher Education. Prerequisites: Appropriate foundational, cognate, and major area coursework and consent of advisor and instructor. Repeatable.
T&L 589. Professional Development: Resident Teacher Program. 2 Credits.
This field-based experience provides mentoring and coaching, translates baccalaureate theory and research into practice, and requires active participation in the school placement and classroom setting. Issues and topics relevant to first year teachers and graduate education are emphasized through field work and discussions. Prerequisite: Admission into the Elementary Education Resident Teacher Program. SS.
T&L 590. Special Topics. 1-4 Credits.
Exploration of special topics in the study of education not regularly included in available course offerings. May be repeated for different topics. Prerequisite: Consent of instructor or advisor. Repeatable.
T&L 591. Readings in Education. 1-4 Credits.
Designed primarily for advanced graduate students. May be repeated for different topics. Prerequisite: Consent of instructor and advisor. Repeatable.
T&L 593. Independent Projects. 1-4 Credits.
Repeatable.
T&L 596. Individual Research in Education. 1-4 Credits.
Prerequisite: Consent of instructor and advisor. Repeatable.
T&L 995. Scholarly Project. 2 Credits.
The scholarly project demonstrates critical analysis and application of information and experiences gained throughout the program of study. The project allows students to demonstrate scholarly skills in an integrated manner that is directly related to their roles as teachers, program evaluators, and action researchers. The scholarly project must be approved by the student's adviser.
T&L 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.
T&L 997. Independent Study. 2 Credits.
Repeatable to 9 credits.
T&L 998. Thesis. 1-9 Credits.
Repeatable to 15 credits.
T&L 999. Dissertation. 1-15 Credits.
Repeatable to 15 credits.
Undergraduate Courses for Graduate Credit
T&L 322. Administration and Leadership in Early Childhood Education. 3 Credits.
An investigation of patterns of administration, curriculum organization, spatial resources, and staffing in early childhood settings, serving children 0-8 years old. Topics include federal and state laws and emerging trends in preschool and primary education in the state, region, and nation. Sixteen (16) hours of field experience. Prerequisite: Admission to the Teacher Education program. S.
T&L 422. Development of the Gifted and Talented. 2 Credits.
Research and theory for understanding the development needs of the more able child in early childhood and in educational experiences. S.
T&L 423. Assessment and Individualized Planning in Special Education. 3 Credits.
A study of the principles and practices of: (1) obtaining diagnostic information on school-related problems of a student; (2) assimilating this information and prescribing appropriate alterations based on continuous measurement data. Prerequisites or Corequisites: TL 315 and T&L 319, F.S.
T&L 493. Workshop. 1-4 Credits.
Special problems in Special Education; consideration of special problems of concern to the Special Education teacher and other educators. Repeatable to 8 credits. F.S.
Master of Science in Curriculum and Instruction
Admission Requirements
The applicant must meet the School of Graduate Studies' current minimum general admission requirements as published in the graduate catalog.
Undergraduate Courses for Graduate Credit
T&L 322. Administration and Leadership in Early Childhood Education. 3 Credits.
An investigation of patterns of administration, curriculum organization, spatial resources, and staffing in early childhood settings, serving children 0-8 years old. Topics include federal and state laws and emerging trends in preschool and primary education in the state, region, and nation. Sixteen (16) hours of field experience. Prerequisite: Admission to the Teacher Education program. S.
T&L 422. Development of the Gifted and Talented. 2 Credits.
Research and theory for understanding the development needs of the more able child in early childhood and in educational experiences. S.
T&L 423. Assessment and Individualized Planning in Special Education. 3 Credits.
A study of the principles and practices of: (1) obtaining diagnostic information on school-related problems of a student; (2) assimilating this information and prescribing appropriate alterations based on continuous measurement data. Prerequisites or Corequisites: TL 315 and T&L 319, F.S.
T&L 493. Workshop. 1-4 Credits.
Special problems in Special Education; consideration of special problems of concern to the Special Education teacher and other educators. Repeatable to 8 credits. F.S.
Track 1: Licensed Teachers
1. A four-year bachelor's degree in Education that leads to licensure at one of the following levels: early childhood education, elementary, middle or secondary education.
2. Cumulative undergraduate grade point average (GPA) of 2.75 or at least 3.00 GPA for the junior and senior years of undergraduate degree (based on A=4.0).
3. Applicants must satisfy the School of Graduate Studies' English Language Proficiency requirements as listed in the Graduate Academic Information section of the graduate catalog. Students who have received a bachelor's degree or higher from the United States or English-speaking Canada are not required to submit the TOEFL.
Admission Process

1. Complete the School of Graduate Studies online application.
2. Submit the application fee of $35.
3. Identify three individuals who will complete the recommendation form: a) an education supervisor or administrator; b) a professional colleague or university professor; 3) a person of your choosing.
4. Send official transcripts from each institution attended to the School of Graduate Studies.
5. Complete the personal statement and attach it in the essay section of the online application. The personal statement should address three prompts and should be no more than 5 double-spaced pages.
   - Provide a narrative describing your chronological history of all professional teaching and administration experience, as well as academic honors or achievements you have earned.
   - What are the characteristics, attitudes, values, and/or skills that you think will make you a good candidate for your professional role?
   - Describe several personal and professional goals you would like to achieve in the next five years. Include in your description reasons why these goals are important to you.

Degree Requirements

Students must satisfy all general requirements established by the School of Graduate Studies as well as specific requirements established for the major in Curriculum and Instruction.

1. A minimum of 32 credits including credits required for the Curriculum and Instruction major for those who have earned a bachelor’s degree and teaching license.
2. A maximum of one-fourth of the credit hours maybe transferred from another institution, depending on the courses and grades.
3. Two credits of Scholarly Project (T&L 995) or Independent Study (T&L 997) or four credits of Thesis (T&L 998).
5. Six credits of electives for the major (e.g., EFR 500 Foundations of Educational Thought, T&L 521 Differentiated Instruction, T&L 590 Special Topics: Technology in the Schools; T&L 524 Reading in the Content Areas, EFR 506 Multicultural Education).
6. Five to six credits of scholarly tools (e.g., T&L 569 Action Research, T&L 579 Classroom Based Inquiry, EFR 509 Introduction to Educational Research, EFR 515 Statistics I).
7. Nine credits of course work that complements the major in Curriculum and Instruction (e.g., content courses in a discipline or coursework in another education program).

Track 1 Sample Program of Study

Requirements for the Major Track 1 (Core – 11-13 Credits)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>T&amp;L 540</td>
<td>Theory and Philosophies of Curriculum in Schools</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 542</td>
<td>Models of Teaching</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 577</td>
<td>Assessment of Learning</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 995</td>
<td>Scholarly Project</td>
<td>2</td>
</tr>
<tr>
<td>or</td>
<td>T&amp;L 997</td>
<td>2</td>
</tr>
<tr>
<td>or</td>
<td>T&amp;L 998</td>
<td>1-9</td>
</tr>
<tr>
<td>Electives for the Major (6 Credits from the following or courses approved by an advisor)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EFR 500</td>
<td>Introduction to the Foundations of Education</td>
<td>3</td>
</tr>
<tr>
<td>EFR 506</td>
<td>Multicultural Education</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 521</td>
<td>Differentiated Instruction</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 524</td>
<td>Reading in the Content Areas</td>
<td>2</td>
</tr>
<tr>
<td>T&amp;L 590</td>
<td>Special Topics</td>
<td>1-4</td>
</tr>
</tbody>
</table>

Research (6 credits from the following)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>T&amp;L 569</td>
<td>Action Research</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 579</td>
<td>Classroom Based Inquiry</td>
<td>3</td>
</tr>
<tr>
<td>EFR 509</td>
<td>Introduction to Applied Educational Research</td>
<td>3</td>
</tr>
<tr>
<td>EFR 515</td>
<td>Statistics I</td>
<td>3</td>
</tr>
</tbody>
</table>

Electives – Cognate (9 credits)

Choose 9 credits of coursework that complements the major

Track 2: Initial Licensure Option

A four-year bachelor’s degree with a major or minor in a license-able content area for secondary education.

1. Cumulative undergraduate grade point average (GPA) of 2.75 or at least 3.00 GPA for the junior and senior years of undergraduate degree (based on A=4.0).
2. Applicants must satisfy the School of Graduate Studies’ English Language Proficiency requirements as listed in the Graduate Academic Information section of the graduate catalog. Students who have received a bachelor’s degree or higher from the United States or English-speaking Canada are not required to submit the TOEFL.

Degree Requirements

Students must satisfy all general requirements established by the School of Graduate Studies as well as specific requirements established for the major in Curriculum and Instruction with preparation for initial licensure.

A minimum of 32 credits including:

1. Five credits of Instructional Methods including 3 credits of Methods and Models of Teaching, which includes credits of content specialized methods of instruction.
2. Six credits of human relations and cultural diversity
3. Six credits of research
4. One credit of Field Experience
5. Six credits in Internship which includes 10 weeks of student teaching in the classroom.
6. Two credits of Scholarly Project (T&L 995)
7. Three credits of Technology Integration- Designing Blended Learning
8. Three credits of inclusive education

Sample Program of Study Requirements for the Major Track 2 (Core - 26 Credits)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>T&amp;L 433</td>
<td>Multicultural Education (undergraduate and graduate</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 542</td>
<td>Models of Teaching (Specialized Instructional Methods)</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 590</td>
<td>Special Topics (Specialized Instructional Methods)</td>
<td>2</td>
</tr>
<tr>
<td>SPED 552</td>
<td>Inclusive Methods (Specialized Instructional Methods)</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 580</td>
<td>Practicum in Schools (field experience)</td>
<td>1</td>
</tr>
<tr>
<td>T&amp;L 584</td>
<td>Internship in Education (10 weeks)</td>
<td>6</td>
</tr>
<tr>
<td>T&amp;L 590</td>
<td>Special Topics (Technology Integration: Designing Blended Learning)</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 995</td>
<td>Scholarly Project</td>
<td>2</td>
</tr>
</tbody>
</table>

Total 26

Research (6 credits from the following):

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>T&amp;L 569</td>
<td>Action Research</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 577</td>
<td>Assessment of Learning</td>
<td>3</td>
</tr>
</tbody>
</table>

Early Childhood Education

M.S. in Early Childhood Education (p. 404)
Courses

T&L 511. Assessment in ECE. 3 Credits.
This course examines the construct and practice of assessment for teaching in birth to third-grade learning environments. The course considers the critical issues related to assessment and accountability in schools, focusing on why assessment is necessary, who the various assessment audiences are, what kind of assessment information is useful for each, and the time frame appropriate for such assessment information. Students study a variety of assessment methods currently used to evaluate teaching and learning in classrooms. They also discuss ways to communicate formative information about student progress to families, collaborate with colleagues to use assessment results to modify grade-level curricula for children with diverse abilities, and advocate for culturally, linguistically, and developmentally-appropriate forms of assessment. S.

T&L 513. Linguistics for ELL Teachers. 3 Credits.
This course introduces the complexities of human language through the study of phonetics, phonology, morphology, syntax and semantics. Additional topics addressed include the brain and language, history of the English language, psycholinguistics, writing systems and language in social contexts. SS.

T&L 514. Introduction to Multilingual Education. 3 Credits.
This course explores language education models, programs and policies with an emphasis on English language learners (ELLs). Political, legal, historical, and cultural contexts of multilingual education will be discussed with a focus on both U.S. and global challenges.

T&L 515. Middle School Curriculum. 3 Credits.
This course examines the middle school curriculum and instructional strategies as well as the needs of early adolescents. The course focuses on the roles teachers play in incorporating a guided, interdisciplinary, collaborative team approach. The studies include the components of curriculum teaming, advisory, exploration, learning communities and instruction (differentiation, cooperative learning, learning styles, instructional strategies) incorporated in middle schools.

T&L 516. Philosophy and Foundations of Middle School Education. 3 Credits.
This course examines the historical and philosophical background of middle level education. The focus is on the roles teachers/administrators play in incorporating this guided, interdisciplinary, collaborative team approach that assists students during these fundamentally transformative years. The course looks at the philosophical aspect of the curriculum and instructional component. The studies explore contemporary issues associated with the middle school as well as the adaptations necessary for special circumstances affiliated with middle schools.

T&L 517. Social Emotional Learning & Guidance. 3 Credits.
This course is designed to offer strategies for caregivers to support young children's positive social and emotional development, behavior, and learning through the exploration of how early experiences shape development. The emotional and social development of children, including the causes, expressions, prevention and management of challenging behaviors in all children birth to age eight are examined. Emphasis is placed on caregiver/family/child relationships, positive emotional/social environments, developmental implications of adverse childhood risk factors, and intervention strategies. Students will identify factors influencing emotional/social development, utilize screening measures, and design positive behavioral supports. SS.

T&L 518. Science in the Elementary School. 3 Credits.
A study of current trends and practices associated with teaching and assessing inquiry-based science in elementary classrooms.

T&L 519. Social Studies in the Elementary School. 3 Credits.
A study of current trends and practices associated with teaching and assessing social studies in elementary classrooms.

T&L 520. Curriculum and Instruction in the Elementary School. 4 Credits.
A study of processes for planning, implementing, and evaluating curriculum and improving instruction in elementary schools.

T&L 521. Differentiated Instruction. 3 Credits.
An introduction to the principles of differentiated instruction. Topics of study include: brain-based learning, responsive instructional and assessment strategies, linking curriculum standards to learner needs, organizing and managing a differentiated classroom, and relevant resources for implementation.

T&L 522. Mathematics in the Elementary School. 3 Credits.
A study of current trends and practices associated with teaching and assessing inquiry-based math in elementary classrooms.

T&L 523. Literacy Instruction for English Language Learners. 3 Credits.
This course addresses the foundations of teaching English language and literacy to English Language Learners (ELLs). Topics will include practices for reading and writing instruction, vocabulary development, assessment of reading and writing, choosing literature for ELLs, and the incorporation of media and technology in ELL literacy instruction. SS.

T&L 524. Reading in the Content Areas. 2 Credits.
How and why reading should be taught in the content areas (i.e. Social Studies, Science, Mathematics, etc.). Research studies in the field of content reading and a variety of instructional practices are reviewed.

T&L 525. Writing in the Classroom. 3 Credits.
This course examines writing as a process that is developmental, cultural, social, and individual. Emphasis is on effective implementation of the essential structures of writing workshop and on monitoring and assessing writers' growth.

T&L 526. Play in Development and Early Childhood Education. 3 Credits.
This course explores the role of play in cognitive, physical and social-emotional development, and the way in which play is incorporated into educational and other programmatic settings. Students will explore how assessment of play indicates a child's development, and they will use assessment to promote Developmentally Appropriate Practices (DAP) for PreK-Grade 3 (ages 3-8) learners.

T&L 527. Curricular Foundations in Early Childhood Education. 3 Credits.
This course examines the historical, philosophical, cultural, race, class, and gender influences on curriculum in early childhood, including the philosophy and mission of the Department of Teaching and Learning.

T&L 528. Children's and Young Adult Literature in the Classroom. 3 Credits.
This course explores the major area of literature for children and young adults in response to two questions: What is the range of literature available for children and young adults today? In what ways might children's and young adult literature be used in the classroom to promote literacy growth? SS.

T&L 529. Language Development & Cognition in Children. 3 Credits.
This course provides foundational information about language and cognitive development in children. The course content will also analyze typical and atypical language and cognitive development. The focus of the course will include children birth to age eight.

T&L 530. Foundations of Reading Instruction. 3-4 Credits.
This course focuses on the relationship between reading theory, research, contemporary issues and instructional practice. Emphasis is placed on reading processes related to effective reading, instructional approaches that support the development of these strategic systems and assessment as collecting evidence of effective reading behaviors.

T&L 531. Early Literacy Development and Instruction. 3 Credits.
A study of early literacy processes including phonemic and print awareness, word recognition, comprehension, and writing. Emphasis is on reviewing current research and theory, assessment and instruction practices, and bridging language and literacy development in literacy rich environments.

T&L 532. Leadership in Literacy. 3 Credits.
The role of the literacy coach is to support teachers in closing the gap between learners' performance and achievement in reading and writing. Topics in this course will include providing leadership for a school's literacy program, collaboration with teachers and administrators, curriculum issues, knowledge of literacy standards, and professional development facilitation. On demand.
T&L 533. Secondary English Language Arts & Literacy Instruction. 3 Credits.
This graduate level course explores teaching literacy in the English Language Arts middle and high school classroom. Students will explore how the traditional and contemporary approaches to teaching literature, nonfiction, and digital media work to support the advanced literacy goals of reading, writing, listening and speaking for adolescents. Students will explore Language Arts instructional methods and develop curriculum in the areas of literature, writer's workshop, academic inquiry, language vocabulary, and digital literacy. Students will also explore the ways the literacy program is supported and assessed throughout the entire secondary school. SS.

T&L 534. Basic Reading Diagnosis and Remediation. 2 Credits.
Focuses on common causes of reading disability, methods of diagnosis, and corrective reading programs in the classroom. Corequisite: T&L 583.

T&L 535. Advanced Reading/Language Arts Diagnosis and Remediation. 2 Credits.
Analysis of interrelationships of learning difficulties in language arts areas and procedures for remediation. Prerequisites: T&L 530 and T&L 534.

T&L 536. Innovations in English Language Arts Instruction. 3 Credits.
This course considers the current curricular trends and research-based best practices in teaching English Language Arts. Students will critically examine and apply current instructional approaches in teaching English language and vocabulary, classroom discourse practices, and digital literacies. We will consider the ways various instructional methods support the advancement of literacy development for all students, considering ways to modify and adapt curriculum to meet the cultural and linguistic diversity of today's classrooms. On demand.

T&L 537. ELL Methods and Materials. 3 Credits.
This course explores current methods and materials in ELL education, with a focus on teaching academic language and sheltered content instruction. F.S.SS.

T&L 538. Supervision of Student Teaching. 2 Credits.
For supervisors and directors of student teaching in colleges and cooperating schools. Principles and practices on how to provide the most beneficial experiences for student teachers.

T&L 539. College Teaching. 3 Credits.
Explores learning styles and teaching styles, the components and responsibilities involved in college teaching, methods of teaching and motivating students, and current issues related to instruction in the college classroom.

T&L 540. Theory and Philosophies of Curriculum in Schools. 3 Credits.
This course explores the historical development of the K-12 curriculum, the philosophical and theoretical aspects applied to curriculum, and the social conditions that impact curriculum.

T&L 541. History of Higher Education in the United States. 3 Credits.
Study of major events and people shaping higher education in the U.S. Role, philosophy, and organization of institutions of higher education discussed.

T&L 542. Models of Teaching. 3 Credits.
This course focuses on various models of teaching: social interaction, information-processing, inquiry and behavioral. The purpose of the course is to provide teachers with a variety of instructional models related to meaningful learning experiences for students.

T&L 543. Scholarly Writing. 3 Credits.
Designed to assist students with learning the art of scholarly writing, this course will aid students in designing, formatting, and completing research-based and other scholarly writing projects, as well as understanding the rules and norms of academic publishing.

T&L 544. Assessment in Higher Education. 3 Credits.
A wide range of assessment issues in higher education will be explored. This includes course, program, and institutional assessment as well as classroom assessment techniques. Students will examine and understand the assessment process.

T&L 545. Adult Learners. 3 Credits.
This course will cover theories of adult development, current research on adult learners, ways of assessing the needs and interests of adult learners, and ways of creating environments in which adult learners can thrive.

T&L 546. College Students with Special Needs. 3 Credits.
This course explores the range of special needs college students bring to campus and how faculty, staff, and administrators might appropriately meet those needs. Prerequisite: Admission to the School of Graduate Studies or instructor permission. S.

T&L 547. Technology in Higher Education. 3 Credits.
Students will examine the various uses and integration of technology and media in higher education by faculty in their attempt to engage learners with each other, the course content, and with instructors.

T&L 548. The Professoriate. 3 Credits.
This course is a study of the development of the American professoriate by way of historical, scholarly, popular, and contemporary perspectives. It also examines the transition of new faculty members to their initial academic appointment.

T&L 549. Seminar. 1-4 Credits.
The seminar will focus on a specific topic relating to teaching and learning. The specific content will vary depending upon student needs and faculty resources. Repeatable. S/U grading.

T&L 550. Assessment and Evaluation in ELL Education. 3 Credits.
This course combines readings and theoretical discussion of assessment with hands-on experience in assessing ELLs. Students will learn how to use a variety of formal and informal assessments with a focus on how to use assessment data in planning instruction. Topics will include classroom-based assessments, language proficiency testing, testing accommodations for ELLs and assessment of ELLs for special education and gifted education, and ELL program evaluation.

T&L 551. Second Language Acquisition for ELL Teachers. 3 Credits.
This course will explore the socio- and psycho-linguistic aspects of interlanguage by studying the theories and research of first and second language acquisition. Students will examine the nature of learners and their individual differences during the stages of language development, with a focus on children and K-12 classrooms.

T&L 553. Collaborative Relationships: Home, School and Community. 3 Credits.
A course appropriate for anyone working with families, early childhood educators, general educators, special educators, related service personnel, administrators and outside agency personnel. Topics covered include: (1) the various models of collaboration and consultation and the stages of each; (2) communication skills; (3) problem-solving; (4) conflict management; (5) diverse perspectives; (6) information collection procedures; (7) supervisory skills; (8) family characteristics and structure across the lifespan; (9) family focused intervention; (10) school choices; and (11) school issues such as poverty, domestic violence, teasing, bullying, and school violence.

T&L 555. Middle School Science and Engineering Lab I: Solids. 2 Credits.
Prerequisites: T&L 558, admission to Graduate School, ND Teacher licensure and Admission to program "Improving Math and Science Literacy of Middle and High School Students of North Dakota Through Teacher-Faculty Partnerships".

T&L 555B. MS Sci.Eng-2: Solids. 3 Credits.
Prerequisites: T&L 558, admission to Graduate School, ND Teacher licensure and Admission to program "Improving Math and Science Literacy of Middle and High School Students of North Dakota Through Teacher-Faculty Partnerships".

T&L 556. Brain in Memory and Learning. 3 Credits.
Prerequisite: Admissions to Grad School.

T&L 557. Language Structure and Analysis for ELL Teachers. 3 Credits.
This course explores the grammatical and discourse structures of the modern English language, analysis of grammar and discourse with a focus on specific problem areas for ELLs, and pedagogical implications for English language development.

T&L 558. Research and Advocacy in TESOL. 3 Credits.
This course prepares teachers to both understand and conduct research in TESOL. Emphasis will be placed on using research data to advocate for changes and improvement in ELL education.

T&L 559. Action Research. 3 Credits.
The study of the philosophy and methods of action research. Emphasis is focused on analysis of and reflection on one's teaching for the purpose of improvements in student learning. Prerequisite: Graduate status. S.
T&L 571. Teacher Education. 3 Credits.
Practices, issues, and trends in the design and implementation and assessment of programs for the preparation and development of K-12 teachers.

T&L 572. Teacher Education: Focus on the Learner. 3 Credits.
The study of teacher education in relation to the lives of P-12 students. This course includes the examination of children and their lives through aspects of race, religion, socioeconomics, linguistics and age, and considers educational implications for preservice and inservice teachers.

T&L 573. Middle School Science and Engineering Lab2:Liq/Gas. 2 Credits. 
T&L 574. MS Sci.Eng-4: Liquid/Gas. 3 Credits. 
Prerequisites: T&L 573, admission to Graduate School, ND Teacher licensure and admission to program "Improving Math and Science Literacy of Middle and High School Students of North Dakota Through Teacher-Faculty Partnerships".

T&L 575. Middle School Science and Engineering Lab3:Mot/Elec. 2 Credits.
T&L 576A. MS Sci.Eng.-6: Motion/Electric. 3 Credits. 
Prerequisites: T&L 576A.

T&L 576B. MS Sci.Eng.-6: Motion/Electric. 3 Credits. 
Prerequisites: T&L 576A.

T&L 577. Assessment of Learning. 3 Credits.
This course addresses the theory and practice of assessment, specifically the process of gathering and discussing information from multiple and diverse sources in order to develop a deep understanding of what students know, understand, and can do with their knowledge as a result of educational experiences.

T&L 579. Classroom Based Inquiry. 3 Credits. 
Concepts learned in T&L 569 will be looked at in-depth and theoretical constructs such as Living Theory, Self Study, and Critical Theory constructs will be studied. Students plan and conduct an in-depth inquiry project within a school setting, complete the associated IRB, and create and academic poster and/or prepare a proposal of the Inquiry project for a professional setting.

Prerequisites: TL graduate status and T&L 569; or by permission of instructor. F,S.

T&L 580. Practicum in Schools. 1-4 Credits. 
Practicum in study of desirable school practices, observations in nearby schools, and application of research findings in solving practical problems. Prerequisites: Appropriate foundational and major area courses, and consent of the instructor and advisor. Repeatable.

T&L 581. Resident Internship. 4 Credits.
A full-time, year-long internship experience conducted in a cooperating school district. Interns are assigned as members of instructional teams with full responsibility for a portion of the cooperating school's instructional program. Prerequisites: Participation in the summer program prior to the internship and teaching licensure (see dept for approval).

T&L 582. Resident Internship. 4 Credits.
A full-time, year-long internship experience conducted in a cooperating school district. Interns are assigned as members of instructional teams with full responsibility for a portion of the cooperating school's instructional program. Prerequisites: Participation in the summer program prior to the internship and teaching licensure (see dept for approval).

T&L 583. Reading Clinic. 2 Credits.

T&L 584. Internship in Education. 1-8 Credits. 
This is a culminating experience primarily for Sixth year and Doctoral students. The internships will be identified in one of the following sub-areas: (A) Educational Administration, (B) Special Education, (C) Curriculum, (D) Educational Research, or (E) Teacher Education. Prerequisites: Appropriate foundational, cognate, and major area coursework and consent of advisor and instructor. Repeatable.

T&L 589. Professional Development: Resident Teacher Program. 2 Credits. 
This field-based experience provides mentoring and coaching, translates baccalaureate theory and research into practice, and requires active participation in the school placement and classroom setting. Issues and topics relevant to first year teachers and graduate education are emphasized through field work and discussions. Prerequisite: Admission into the Elementary Education Resident Teacher Program. SS.

T&L 590. Special Topics. 1-4 Credits. 
Exploration of special topics in the study of education not regularly included in available course offerings. May be repeated for different topics. Prerequisite: Consent of instructor or advisor. Repeatable.

T&L 591. Readings in Education. 1-4 Credits. 
Designed primarily for advanced graduate students. May be repeated for different topics. Prerequisite: Consent of instructor and advisor. Repeatable.

T&L 592. MS Sci.Eng.-6: Motion/Electric. 3 Credits. 
Prerequisites or Corequisites: T&L 315 and T&L 319. F,S.

T&L 593. Independent Projects. 1-4 Credits. 
Repeatable.

T&L 594. Individual Research in Education. 1-4 Credits. 
Prerequisite: Consent of instructor and advisor. Repeatable.

T&L 995. Scholarly Project. 2 Credits. 
The scholarly project demonstrates critical analysis and application of information and experiences gained throughout the program of study. The project allows students to demonstrate scholarly skills in an integrated manner that is directly related to their roles as teachers, program evaluators, and action researchers. The scholarly project must be approved by the student's advisor.

T&L 996. Continuing Enrollment. 1-12 Credits. 
Repeatable. S/U grading.

T&L 997. Independent Study. 2 Credits.

T&L 998. Thesis. 1-9 Credits. 
Repeatable to 9 credits.

T&L 999. Dissertation. 1-15 Credits. 
Repeatable to 15 credits.

Undergraduate Courses for Graduate Credit
T&L 322. Administration and Leadership in Early Childhood Education. 3 Credits.
An investigation of patterns of administration, curriculum organization, spatial resources, and staffing in early childhood settings, serving children 0-8 years old. Topics include federal and state laws and emerging trends in preschool and primary education in the state, region, and nation. Sixteen (16) hours of field experience. Prerequisite: Admission to the Teacher Education program. S.

T&L 422. Development of the Gifted and Talented. 2 Credits.
Research and theory for understanding the development needs of the more able child in early childhood and in educational experiences.

T&L 423. Assessment and Individualized Planning in Special Education. 3 Credits.
A study of the principles and practices of: (1) obtaining diagnostic information on school-related problems of a student; (2) assimilating this information and prescribing appropriate alterations based on continuous measurement data. Prerequisites or Corequisites: TL 315 and T&L 319. F,S.

T&L 493. Workshop. 1-4 Credits.
Special problems in Special Education; consideration of special problems of concern to the Special Education teacher and other educators. Repeatable to 8 credits. F,S.

Master of Science in Early Childhood Education
Admission Requirements
The applicant must meet the School of Graduate Studies' current minimum general admission requirements as published in the graduate catalog.

1. An undergraduate degree in early childhood education, child development, elementary education, or a related field.
2. A cumulative Grade Point Average (GPA) of at least 2.75 for all undergraduate work or a GPA of at least 3.0 for the junior and senior years of undergraduate work (based on A = 4.00).
3. Satisfy the School of Graduate Studies' English Language Proficiency requirements as published in the graduate catalog.
4. Transcripts, recommendations for admission, and a personal statement, i.e., a response to three essay prompts, are part of the School of Graduation Studies and Early Childhood Education application procedure. The personal statement essay should be 2-3 pages in length and the prompts are:
a. What have you already done professionally or personally of which you are proud? Please include a chronological history of all professional teaching and administration experience, as well as academic honors or achievements you earned.

b. What are the characteristics, attitudes, values, and/or skills that you think will make you a good candidate for your professional role?

c. Describe several personal and professional goals you would like to achieve in the next five years. Include in your description reasons why these goals are important to you.

Degree Requirements

The M.S. degree in Early Childhood Education is available in two options: nonthesis option and the thesis option. The program of study is developed together with the student's advisor (non-thesis option, 32 credits) or with a student's thesis committee (thesis option, 30 credits).

Non-Thesis Option:
1. Thirty-two credits including credits required for the major.
3. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.
4. All credits must be approved graduate level courses.
5. The program may include just the major, the major and the minor, or the major and a cognate area. The major must include 20 credits from the major department and the minor or cognate must include nine credits.
6. Completion of a two-credit practicum (60 hours) in an early childhood setting.
7. Preparation of a written independent study or scholarly project approved by the faculty adviser.

Thesis Option:
1. A minimum of 30 semester credits in a major field, including the credits granted for the thesis and the research leading to a 4-6-credit T&L 998 Thesis.
2. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.
3. All credits must be approved graduate level courses.
4. The program may include just the major, the major and a minor, or the major and a cognate area. The major must include 20 credits from the major department and the minor or cognate must include nine credits.
5. Preparation and successful defense of a thesis.

This program of graduate study can be completed in 18 months going full-time or 24 months going part-time (two courses per semester). Courses are offered on campus, online and a combination of the two.

Required Courses:

Major

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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>SPED 510</td>
<td>Introduction to Early Childhood Special Education</td>
<td>3</td>
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<tr>
<td>T&amp;L 517</td>
<td>Social Emotional Learning &amp; Guidance</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 526</td>
<td>Play in Development and Early Childhood Education</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 527</td>
<td>Curricular Foundations in Early Childhood Education</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 529</td>
<td>Language Development &amp; Cognition in Children</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 530</td>
<td>Foundations of Reading Instruction</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 553</td>
<td>Collaborative Relationships: Home, School and Community</td>
<td>3</td>
</tr>
<tr>
<td>T&amp;L 580</td>
<td>Practicum in Schools</td>
<td>3</td>
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<tr>
<td>T&amp;L 995</td>
<td>Scholarly Project</td>
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<tr>
<td>or T&amp;L 997</td>
<td>Independent Study</td>
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<td>or T&amp;L 998</td>
<td>Thesis</td>
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Scholarly Tools

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<td>EFR 509</td>
<td>Introduction to Applied Educational Research</td>
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<tr>
<td>T&amp;L 511</td>
<td>Assessment in ECE</td>
<td>3</td>
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Total Credits

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Students are required to take T&L 580 Practicum in Schools. This practicum requires 60 hours in an early childhood setting, which could be the candidate's work setting if it meets required accreditation standards.

Elementary Education

M.S. in Elementary Education (p. 408)
M.Ed. in Elementary Education (p. 408)

Courses

T&L 511. Assessment in ECE. 3 Credits.
This course examines the construct and practice of assessment for teaching in birth to third-grade learning environments. The course considers the critical issues related to assessment and accountability in schools, focusing on why assessment is necessary, who the various assessment audiences are, what kind of assessment information is useful for each, and the time frame appropriate for such assessment information. Students study a variety of assessment methods currently used to evaluate teaching and learning in classrooms. They also discuss ways to communicate formative information about student progress to families, collaborate with colleagues to use assessment results to modify grade-level curricula for children with diverse abilities, and advocate for culturally, linguistically, and developmentally-appropriate forms of assessment. SS.

T&L 513. Linguistics for ELL Teachers. 3 Credits.
This course introduces the complexities of human language through the study of phonetics, phonology, morphology, syntax and semantics. Additional topics addressed include the brain and language, history of the English language, psycholinguistics, writing systems and language in social contexts. SS.

T&L 514. Introduction to Multilingual Education. 3 Credits.
This course explores language education models, programs and policies with an emphasis on English language learners (ELLs), Political, legal, historical, and cultural contexts of multilingual education will be discussed with a focus on both U.S. and global challenges.

T&L 515. Middle School Curriculum. 3 Credits.
This course examines the middle school curriculum and instructional strategies as well as the needs of early adolescents. The course focuses on the roles teachers play in incorporating a guided, interdisciplinary, collaborative team approach. The studies include the components of curriculum teaming, advisory, exploration, learning communities) and instruction (differentiation, cooperative learning, learning styles, instructional strategies) incorporated in middle schools.

T&L 516. Philosophy and Foundations of Middle School Education. 3 Credits.
This course examines the historical and philosophical background of middle level education. The focus is on the roles teachers/administrators play in incorporating this guided, interdisciplinary, collaborative team approach that assists students during these fundamentally transformative years. The course looks at the philosophical aspect of the curriculum and instructional component. The studies explore contemporary issues associated with the middle school as well as the adaptations necessary for special circumstances affiliated with middle schools.

T&L 517. Social Emotional Learning & Guidance. 3 Credits.
This course is designed to offer strategies for caregivers to support young children’s positive social and emotional development, behavior, and learning through the exploration of how early experiences shape development. The emotional and social development of children, including the causes, expressions, prevention and management of challenging behaviors in all children birth to age eight are examined. Emphasis is placed on caregiver/family/child relationships, positive emotional/social environments, developmental implications, adverse childhood risk factors, and intervention strategies. Students will identify factors influencing emotional/social development, utilize screening measures, and design positive behavioral supports. SS.

T&L 518. Science in the Elementary School. 3 Credits.
A study of current trends and practices associated with teaching and assessing inquiry-based science in elementary classrooms.

T&L 519. Social Studies in the Elementary School. 3 Credits.
A study of current trends and practices associated with teaching and assessing social studies in elementary classrooms.
T&L 520. Curriculum and Instruction in the Elementary School. 4 Credits.
A study of processes for planning, implementing, and evaluating curriculum and
improving instruction in elementary schools.

T&L 521. Differentiated Instruction. 3 Credits.
An introduction to the principles of differentiated instruction. Topics of study
include: brain-based learning, responsive instructional and assessment
strategies, linking curriculum standards to learner needs, organizing
and managing a differentiated classroom, and relevant resources for
implementation.

T&L 522. Mathematics in the Elementary School. 3 Credits.
A study of current trends and practices associated with teaching and assessing
inquiry-based math in elementary classrooms.

T&L 523. Literacy Instruction for English Language Learners. 3 Credits.
This course addresses the foundations of teaching English language and
literacy to English Language Learners (ELLs). Topics will include practices
for reading and writing instruction, vocabulary development, assessment of
reading and writing, choosing literature for ELLs, and the incorporation of media
and technology in ELL literacy instruction. SS.

T&L 524. Reading in the Content Areas. 2 Credits.
How and why reading should be taught in the content areas (i.e. Social Studies,
Science, Mathematics, etc.). Research studies in the field of content reading
and a variety of instructional practices are reviewed.

T&L 525. Writing in the Classroom. 3 Credits.
This course examines writing as a process that is developmental, cultural,
social, and individual. Emphasis is on effective implementation of the essential
structures of writing workshop and on monitoring and assessing writers' growth.

T&L 526. Play in Development and Early Childhood Education. 3 Credits.
This course explores the role of play in cognitive, physical and social-emotional
development, and the way in which play is incorporated into educational and
other programmatic settings. Students will explore how assessment of play
indicates a child's development, and they will use assessment to promote
Developmentally Appropriate Practices (DAP) for PreK-Grade 3 (ages 3-8)
learners.

T&L 527. Curricular Foundations in Early Childhood Education. 3 Credits.
This course examines the historical, philosophical, cultural, race, class, and
gender influences on curriculum in early childhood, including the philosophy
and mission of the Department of Teaching and Learning.

T&L 528. Children’s and Young Adult Literature in the Classroom. 3
Credits.
This course explores the major area of literature for children and young adults
in response to two questions: What is the range of literature available for
children and young adults today? In what ways might children’s and young
adult literature be used in the classroom to promote literacy growth?. SS.

T&L 529. Language Development & Cognition in Children. 3 Credits.
This course provides foundational information about language and cognitive
development in children. The course content will also analyze typical and
atypical language and cognitive development. The focus of the course will
include children birth to age eight.

T&L 530. Foundations of Reading Instruction. 3-4 Credits.
This course focuses on the relationship between reading theory, research,
contemporary issues and instructional practice. Emphasis is placed on strategic
systems related to effective reading, instructional approaches that support the
development of these strategic systems and assessment as collecting evidence of
effective reading behaviors.

T&L 531. Early Literacy Development and Instruction. 3 Credits.
A study of early literacy processes including phonemic and print awareness,
word recognition, comprehension, and writing. Emphasis is on reviewing
current research and theory, assessment and instruction practices, and
bridging language and literacy development in literacy rich environments.

T&L 532. Leadership in Literacy. 3 Credits.
The role of the literacy coach is to support teachers in closing the gap between
learners' performance and achievement in reading and writing. Topics in
this course will include providing leadership for school's literacy program,
collaboration with teachers and administrators, curriculum issues, knowledge of
literacy standards, and professional development facilitation. On demand.

T&L 533. Secondary English Language Arts & Literacy Instruction. 3
Credits.
This graduate level course explores teaching literacy in the English Language
Arts middle and high school classroom. Students will explore how the traditional
and contemporary approaches to teaching literature, nonfiction, and digital
media work to support the advanced literacy goals of reading, writing, listening
and speaking for adolescents. Students will explore Language Arts Instructional
methods and develop curriculum in the areas of literature, writer's workshop,
academic inquiry, language vocabulary, and digital literacy. Students will also
explore ways the literacy program is supported and assessed throughout
the entire secondary school. SS.

T&L 534. Basic Reading Diagnosis and Remediation. 2 Credits.
Focuses on common causes of reading disability, methods of diagnosis, and
corrective reading programs in the classroom. Corequisite: T&L 583.

T&L 535. Advanced Reading/Language Arts Diagnosis and Remediation. 2
Credits.
Analysis of interrelationships of learning difficulties in language arts areas and
procedures for remediation. Prerequisites: T&L 530 and T&L 534.

T&L 536. Innovations in English Language Arts Instruction. 3 Credits.
This course considers the current curriculum trends and research-based best
practices in teaching English Language Arts. Students will critically examine
and apply current instructional approaches in teaching English language
and vocabulary, classroom discourse practices, and digital literacies. We will
consider the ways various instructional methods support the advancement of
literacy development for all students, considering ways to modify and adapt
curriculum to meet the cultural and linguistic diversity of today's classrooms. On
demand.

T&L 537. ELL Methods and Materials. 3 Credits.
This course explores current methods and materials in ELL education, with
a focus on teaching academic language and sheltered content instruction.
F,S,SS.

T&L 538. Supervision of Student Teaching. 2 Credits.
For supervisors and directors of student teaching in colleges and cooperating
schools. Principles and practices on how to provide the most beneficial
experiences for student teachers.

T&L 539. College Teaching. 3 Credits.
Explores learning styles and teaching styles, the components and
responsibilities involved in college teaching, methods of teaching and
motivating students, and current issues related to instruction in the college
classroom.

T&L 540. Theory and Philosophies of Curriculum in Schools. 3 Credits.
This course explores the historical development of the K-12 curriculum, the
philosophical and theoretical aspects applied to curriculum, and the social
conditions that impact curriculum.

T&L 541. History of Higher Education in the United States. 3 Credits.
Study of major events and people shaping higher education in the U.S. Role,
philosophy, and organization of institutions of higher education discussed.

T&L 542. Models of Teaching. 3 Credits.
This course focuses on various models of teaching: social interaction,
information-processing, inquiry and behavioral. The purpose of the course is
to provide teachers with a variety of instructional models related to meaningful
learning experiences for students.

T&L 543. Scholarly Writing. 3 Credits.
Designed to assist students with learning the art of scholarly writing, this course
will aid students in designing, formatting, and completing research-based and
other scholarly writing projects, as well as understanding the rules and norms of
academic publishing.

T&L 544. Assessment in Higher Education. 3 Credits.
A wide range of assessment issues in higher education will be explored. This
includes course, program, and institutional assessment as well as classroom
assessment techniques. Students will examine and understand the assessment
process.

T&L 545. Adult Learners. 3 Credits.
This course will cover theories of adult development, current research on adult
learners, ways of assessing the needs and interests of adult learners, and ways
of creating environments in which adult learners can thrive.
T&L 546. College Students with Special Needs. 3 Credits.
This course explores the range of special needs college students bring to campus and how faculty, staff, and administrators might appropriately meet those needs. Prerequisite: Admission to the School of Graduate Studies or instructor permission. S.

T&L 547. Technology in Higher Education. 3 Credits.
Students will examine the various uses and integration of technology and media in higher education by faculty in their attempt to engage learners with each other, the course content, and with instructors.

T&L 548. The Professoriate. 3 Credits.
This course is a study of the development of the American professoriate by way of historical, scholarly, popular, and contemporary perspectives. It also examines the transition of new faculty members to their initial academic appointment.

T&L 549. Seminar. 1-4 Credits.
The seminar will focus on a specific topic relating to teaching and learning. The specific content will vary depending upon student needs and faculty resources. Repeatable. S/U grading.

T&L 550. Assessment and Evaluation in ELL Education. 3 Credits.
This course combines readings and theoretical discussion of assessment with hands-on experience in assessing ELLs. Students will learn how to use a variety of formal and informal assessments with a focus on how to use assessment data in planning instruction. Topics will include classroom-based assessments, language proficiency testing, testing accommodations for ELLs, and assessment of ELLs for special education and gifted education, and ELL program evaluation.

T&L 551. Second Language Acquisition for ELL Teachers. 3 Credits.
This course will explore the socio- and psycho-linguistic aspects of interlanguage by studying the theories and research of first and second language acquisition. Students will examine the nature of learners and their individual differences during the stages of language development, with a focus on children and K-12 classrooms.

T&L 553. Collaborative Relationships: Home, School and Community. 3 Credits.
A course appropriate for anyone working with families, early childhood educators, general educators, special educators, related service personnel, administrators and outside agency personnel. Topics covered include: (1) the various models of collaboration and consultation and the stages of each; (2) communication skills; (3) problem-solving; (4) conflict management; (5) diverse perspectives; (6) information collection procedures; (7) supervisory skills; (8) family characteristics and structure across the lifespan; (9) family focused intervention; (10) school choices; and (11) school issues such as poverty, domestic violence, teasing, bullying, and school violence.

T&L 558. Middle School Science and Engineering Lab1:Solids. 2 Credits.

T&L 559A. MS Sci.Eng-2: Solids. 3 Credits.
Prerequisites: T&L 558, admission to Graduate School, ND Teacher licensure and Admission to program "Improving Math and Science Literacy of Middle and High School Students of North Dakota Through Teacher-Faculty Partnerships".

T&L 559B. MS Sci.Eng-2: Solids. 3 Credits.
Prerequisites: T&L 558, admission to Graduate School, ND Teacher licensure and Admission to program "Improving Math and Science Literacy of Middle and High School Students of North Dakota Through Teacher-Faculty Partnerships".

T&L 566. Brain in Memory and Learning. 3 Credits.
Prerequisite: Admissions to Grad School.

T&L 567. Language Structure and Analysis for ELL Teachers. 3 Credits.
This course explores the grammatical and discourse structures of the modern English language, analysis of grammar and discourse with a focus on specific problem areas for ELLs, and pedagogical implications for English language development.

T&L 568. Research and Advocacy in TESOL. 3 Credits.
This course prepares teachers to both understand and conduct research in TESOL. Emphasis will be placed on using research data to advocate for changes and improvement in ELL education.

T&L 569. Action Research. 3 Credits.
The study of the philosophy and methods of action research. Emphasis is focused on analysis of and reflection on one's teaching for the purpose of improvements in student learning. Prerequisite: Graduate status. S.

T&L 571. Teacher Education. 3 Credits.
Practices, issues, and trends in the design and implementation and assessment of programs for the preparation and development of K-12 teachers.

T&L 572. Teacher Education: Focus on the Learner. 3 Credits.
The study of teacher education in relation to the lives of P-12 students. This course includes the examination of children and their lives through aspects of race, religion, socioeconomics, linguistics and age, and considers educational implications for preservice and in-service teachers.

T&L 573. Middle School Science and Engineering Lab2:Liq/Gas. 3 Credits.

T&L 574. MS Sci.Eng-4: Liquid/Gas. 3 Credits.
Prerequisites: T&L 573, admission to Graduate School, ND Teacher licensure and Admission to program "Improving Math and Science Literacy of Middle and High School Students of North Dakota Through Teacher-Faculty Partnerships".

T&L 575. Middle School Science and Engineering Lab3:Mot/Elec. 2 Credits.

T&L 576A. MS Sci.Eng.-6:Motion/Electric. 3 Credits.
Prerequisites: T&L 575, admission to Graduate School, ND Teacher Licensure and employment as a teacher in a ND school.

T&L 576B. MS Sci.Eng.-6:Motion/Electric. 3 Credits.
Prerequisite: T&L 576A.

T&L 577. Assessment of Learning. 3 Credits.
This course addresses the theory and practice of assessment, specifically the process of gathering and discussing information from multiple and diverse sources in order to develop a deep understanding of what students know, understand, and can do with their knowledge as a result of educational experiences.

T&L 579. Classroom Based Inquiry. 3 Credits.
Concepts learned in T&L 569 will be looked at in-depth and theoretical constructs such as Living Theory, Self Study, and Critical Theory constructs will be studied. Students plan and conduct an in-depth inquiry project within a school setting, complete the associated IRB, and create and academic poster and/or prepare a proposal of the Inquiry project for a professional setting.
Prerequisites: TL graduate status and T&L 569; or by permission of instructor. F.S.

T&L 580. Practicum in Schools. 1-4 Credits.
Practicum in study of desirable school practices, observations in nearby schools, and application of research findings in solving practical problems. Prerequisites: Appropriate foundational and major area courses, and consent of the instructor and advisor. Repeatable.

T&L 581. Resident Internship. 4 Credits.
A full-time, year-long internship experience conducted in a cooperating school district. Interns are assigned as members of instructional teams with full responsibility for a portion of the cooperating school's instructional program.
Prerequisites: Participation in the summer program prior to the internship and teaching licensure (see dept for approval).

T&L 582. Resident Internship. 4 Credits.
A full-time, year-long internship experience conducted in a cooperating school district. Interns are assigned as members of instructional teams with full responsibility for a portion of the cooperating school's instructional program.
Prerequisites: Participation in the summer program prior to the internship and teaching licensure (see dept for approval).

T&L 583. Reading Clinic. 2 Credits.

T&L 584. Internship in Education. 1-8 Credits.
This is a culminating experience primarily for Sixth year and Doctoral students. The internships will be identified in one of the following sub-areas: (A) Educational Administration, (B) Special Education, (C) Curriculum, (D) Educational Research, or (E) Teacher Education. Prerequisites: Appropriate foundational, cognate, and major area coursework and consent of advisor and instructor. Repeatable.

T&L 589. Professional Development: Resident Teacher Program. 2 Credits.
This field-based experience provides mentoring and coaching, translates baccalaureate theory and research into practice, and requires active participation in the school placement and classroom setting. Issues and topics relevant to first year teachers and graduate education are emphasized through field work and discussions. Prerequisite: Admission into the Elementary Education Resident Teacher Program. SS.
T&L 590. Special Topics. 1-4 Credits.
Exploration of special topics in the study of education not regularly included in available course offerings. May be repeated for different topics. Prerequisite: Consent of instructor or advisor. Repeatable.

T&L 591. Readings in Education. 1-4 Credits.
Designed primarily for advanced graduate students. May be repeated for different topics. Prerequisite: Consent of instructor and advisor. Repeatable.

T&L 593. Independent Projects. 1-4 Credits.
Repeatable.

T&L 596. Individual Research in Education. 1-4 Credits.
Prerequisite: Consent of instructor and advisor. Repeatable.

T&L 995. Scholarly Project. 2 Credits.
The scholarly project demonstrates critical analysis and application of information and experiences gained throughout the program of study. The project allows students to demonstrate scholarly skills in an integrated manner that is directly related to their roles as teachers, program evaluators, and action researchers. The scholarly project must be approved by the student's adviser.

T&L 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

T&L 997. Independent Study. 2 Credits.
Repeatable to 9 credits.

T&L 999. Dissertation. 1-15 Credits.
Repeatable to 15 credits.

Undergraduate Courses for Graduate Credit

T&L 322. Administration and Leadership in Early Childhood Education. 3 Credits.
An investigation of patterns of administration, curriculum organization, spatial resources, and staffing in early childhood settings, serving children 0-8 years old. Topics include federal and state laws and emerging trends in preschool and primary education in the state, region, and nation. Sixteen (16) hours of field experience. Prerequisite: Admission to the Teacher Education program. S.

T&L 422. Development of the Gifted and Talented. 2 Credits.
Research and theory for understanding the development needs of the more able child in early childhood and in educational experiences. S.

T&L 423. Assessment and Individualized Planning in Special Education. 3 Credits.
A study of the principles and practices of: (1) obtaining diagnostic information on school-related problems of a student; (2) assimilating this information and prescribing appropriate alterations based on continuous measurement data. Prerequisites or Corequisites: TL 315 and T&L 319. F,S.

T&L 493. Workshop. 1-4 Credits.
Special problems in Special Education; consideration of special problems of concern to the Special Education teacher and other educators. Repeatable to 8 credits. F,S.

Master of Education in Elementary Education

Admission Requirements
The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. Teacher licensure
2. A cumulative Grade Point Average (GPA) of at least 2.75 for all undergraduate work or a GPA of at least 3.0 for the junior and senior years of undergraduate work (based on A= 4.00).
3. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

Refer to the Admissions section of the graduate catalog for additional information on admission requirements and application procedures.

Degree Requirements
Licensed persons are eligible for the Master of Education degree. The major portion of the program includes coursework that addresses practical aspects of teaching at the elementary school level—literacy development, mathematics, science, social studies, curriculum development, and working with families. Available courses focus on the relationship between theories of child development and educational practices designed to foster that development. The program culminates in a final paper, project, or thesis.

Non-Thesis Option:
1. Thirty-two (32) credits including credits required for the major.
2. A minimum of three credits of Independent Study
3. At least one-half of the credits must be at or above the 500-level.
4. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.
5. Preparation of a written independent study approved by the faculty advisor.

Thesis Option:
1. A minimum of 30 semester credits in a major field, including the credits granted for the thesis and the research leading to the thesis.
2. At least one-half of the credits must be at or above the 500-level.
3. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.

Required Courses for the Master of Education

Major: Elementary Education

Required Core Courses
T&L 518 Science in the Elementary School 3
T&L 519 Social Studies in the Elementary School 3
T&L 522 Mathematics in the Elementary School 3
T&L 530 Foundations of Reading Instruction 3
T&L 580 Practicum in Schools 3-4

Cognate
T&L 569 Action Research (Recommended) 3
Elective 3

Foundations
EFR 500 Introduction to the Foundations of Education 3
EFR Elective 3

Other Required Coursework
T&L 995 Scholarly Project 2-6
or T&L 999 Independent Study
or T&L 997 Thesis
Electives 3

Total Credits 30-37

Master of Science in Elementary Education

Admission Requirements
The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. Teacher licensure or a baccalaureate degree
2. A cumulative Grade Point Average (GPA) of at least 2.75 for all undergraduate work or a GPA of at least 3.0 for the junior and senior years of undergraduate work (based on A= 4.00).
3. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

Refer to the Admissions section of the graduate catalog for additional information on admission requirements and application procedures.
## Degree Requirements

Degree requirements for the Master of Science Degree in Elementary Education include:

A detailed description of the M.S. degree may be found in the Degree Requirements section. Scholarly tool requirements are described in the Education departmental section.

The Master of Science Degree in Elementary Education is available in two tracks. Track I, either thesis or non-thesis, is open to licensed or non-licensed persons who wish to follow a research-oriented program of study. Track I requires a minimum of five credits of scholarly tool coursework and allows a maximum three credits of readings.

Track II, available only in the non-thesis option, provides opportunity for non-licensed persons to study Elementary Education at the graduate level. Track II requires a minimum of six credits of coursework in Foundations of Education.

### Non-Thesis Option:

1. Thirty-two (32) credits including credits required for the major.
2. A minimum of three credits of Independent Study
3. At least one-half of the credits must be at or above the 500-level.
4. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.
5. Preparation of a written independent study approved by the faculty advisor.

### Thesis Option:

1. A minimum of 30 semester credits in a major field, including the credits granted for the thesis and the research leading to the thesis.
2. At least one-half of the credits must be at or above the 500-level.
3. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.

## Required Courses for the Master of Science Degree

### Major: Elementary Education (Track I)

#### Required Core

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#### Electives

- Depends on thesis or non-thesis option: 3-9

#### Scholarly Tools

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#### Other Required Coursework

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#### Total Credits

24-37

### Major: Elementary Education (Track II)

#### Required Core Courses

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#### Electives

- Depends on thesis or non-thesis option: 3-9

#### Foundations

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#### Other Required Coursework

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#### Total Credits

24-37

### English Language Learners (TESOL)

M.Ed. in ELL Education (p. 412)

Graduate Certificate of TESOL (http://und-public.courseleaf.com/graduateacademicinformation/departmentalcoursesprograms/education/educ-cert-ell)

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**Courses**

**T&L 511. Assessment in ECE. 3 Credits.**

This course examines the construct and practice of assessment for teaching in birth to third-grade learning environments. The course considers the critical issues related to assessment and accountability in schools, focusing on why assessment is necessary, who the various assessment audiences are, what kind of assessment information is useful for each, and the time frame appropriate for such assessment information. Students study a variety of assessment methods currently used to evaluate teaching and learning in classrooms. They also discuss ways to communicate formative information about student progress to families, collaborate with colleagues to use assessment results to modify grade-level curricula for children with diverse abilities, and advocate for culturally, linguistically, and developmentally-appropriate forms of assessment.

**T&L 513. Linguistics for ELL Teachers. 3 Credits.**

This course explores language education models, programs and policies with an emphasis on English language learners (ELLs). Political, legal, historical, and cultural contexts of multilingual education will be discussed with a focus on both U.S. and global challenges.

**T&L 514. Introduction to Multilingual Education. 3 Credits.**

This course introduces the complexities of human language through the study of phonetics, phonology, morphology, syntax and semantics. Additional topics addressed include the brain and language, history of the English language, psycholinguistics, writing systems and language in social contexts.

**T&L 515. Middle School Curriculum. 3 Credits.**

This course examines the middle school curriculum and instructional strategies as well as the needs of early adolescents. The course focuses on the roles teachers play in incorporating a guided, interdisciplinary, collaborative team approach. The studies include the components of curriculum teaming, advisory, exploration, learning communities and instruction (differential, cooperative learning, learning styles, instructional strategies) incorporated in middle schools.

**T&L 516. Philosophy and Foundations of Middle School Education. 3 Credits.**

This course examines the historical and philosophical background of middle level education. The focus is on the roles teachers/administrators play in incorporating this guided, interdisciplinary, collaborative team approach that assists students during these fundamentally transformative years. The course looks at the philosophical aspect of the curriculum and instructional component. The studies explore contemporary issues associated with the middle school as well as the adaptations necessary for special circumstances affiliated with middle schools.
T&L 517. Social Emotional Learning & Guidance. 3 Credits.
This course is designed to offer strategies for caregivers to support young children's positive social and emotional development, behavior, and learning through the exploration of how early experiences shape development. The emotional and social development of children, including the causes, expressions, prevention and management of challenging behaviors in all children birth to age eight are examined. Emphasis is placed on caregiver/family/child relationships, positive emotional/social environments, developmental implications, adverse childhood risk factors, and intervention strategies. Students will identify factors influencing emotional/social development, utilize screening measures, and design positive behavioral supports. SS.

T&L 518. Science in the Elementary School. 3 Credits.
A study of current trends and practices associated with teaching and assessing inquiry-based science in elementary classrooms.

T&L 519. Social Studies in the Elementary School. 3 Credits.
A study of current trends and practices associated with teaching and assessing social studies in elementary classrooms.

T&L 520. Curriculum and Instruction in the Elementary School. 4 Credits.
A study of processes for planning, implementing, and evaluating curriculum and improving instruction in elementary schools.

T&L 521. Differentiated Instruction. 3 Credits.
An introduction to the principles of differentiated instruction. Topics of study include: brain-based learning, responsive instructional and assessment strategies, linking curriculum standards to learner needs, organizing and managing a differentiated classroom, and relevant resources for implementation.

T&L 522. Mathematics in the Elementary School. 3 Credits.
A study of current trends and practices associated with teaching and assessing inquiry-based math in elementary classrooms.

T&L 523. Literacy Instruction for English Language Learners. 3 Credits.
This course addresses the foundations of teaching English language and literacy to English Language Learners (ELLs). Topics will include practices for reading and writing instruction, vocabulary development, assessment of reading and writing, choosing literature for ELLs, and the incorporation of media and technology in ELL literacy instruction. SS.

T&L 524. Reading in the Content Areas. 2 Credits.
How and why reading should be taught in the content areas (i.e. Social Studies, Science, Mathematics, etc.). Research studies in the field of content reading and a variety of instructional practices are reviewed.

T&L 525. Writing in the Classroom. 3 Credits.
This course examines writing as a process that is developmental, cultural, social, and individual. Emphasis is on effective implementation of the essential structures of writing workshop and on monitoring and assessing writers' growth.

T&L 526. Play in Development and Early Childhood Education. 3 Credits.
This course explores the role of play in cognitive, physical and social-emotional development, and the way in which play is incorporated into educational and other programmatic settings. Students will explore how assessment of play indicates a child's development, and they will use assessment to promote Developmentally Appropriate Practices (DAP) for PreK-Grade 3 (ages 3-8) learners.

T&L 527. Curricular Foundations in Early Childhood Education. 3 Credits.
This course examines the historical, philosophical, cultural, race, class, and gender influences on curriculum in early childhood, including the philosophy and mission of the Department of Teaching and Learning.

T&L 528. Children's and Young Adult Literature in the Classroom. 3 Credits.
This course explores the major area of literature for children and young adults in response to two questions: What is the range of literature available for children and young adults today? In what ways might children's and young adult literature be used in the classroom to promote literacy growth?. SS.

T&L 529. Language Development & Cognition in Children. 3 Credits.
This course provides foundational information about language and cognitive development in children. The course content will also analyze typical and atypical language and cognitive development. The focus of the course will include children birth to age eight.

T&L 530. Foundations of Reading Instruction. 3-4 Credits.
This course focuses on the relationship between reading theory, research, contemporary issues and instructional practice. Emphasis is placed on strategic systems related to effective reading, instructional approaches that support the development of these strategic systems and assessment as collecting evidence of effective reading behaviors.

T&L 531. Early Literacy Development and Instruction. 3 Credits.
A study of early literacy processes including phonemic and print awareness, word recognition, comprehension, and writing. Emphasis is on reviewing current research and theory, assessment and instruction practices, and bridging language and literacy development in literacy rich environments.

T&L 532. Leadership in Literacy. 3 Credits.
The role of the literacy coach is to support teachers in closing the gap between learners' performance and achievement in reading and writing. Topics in this course will include providing leadership for a school's literacy program, collaboration with teachers and administrators, curriculum issues, knowledge of literacy standards, and professional development facilitation. On demand.

T&L 533. Secondary English Language Arts & Literacy Instruction. 3 Credits.
This course addresses the foundations of teaching English language arts middle and high school classroom. Students will explore how the traditional and contemporary approaches to teaching literature, nonfiction, and digital media work to support the advanced literacy goals of reading, writing, listening and speaking for adolescents. Students will explore Language Arts instructional methods and develop curriculum in the areas of literature, writer's workshop, academic inquiry, language vocabulary, and digital literacy. Students will also explore the ways the literacy program is supported and assessed throughout the entire secondary school. SS.

T&L 534. Basic Reading Diagnosis and Remediation. 2 Credits.
Focuses on common causes of reading disability, methods of diagnosis, and corrective reading programs in the classroom. Corequisite: T&L 583.

T&L 535. Advanced Reading/Language Arts Diagnosis and Remediation. 2 Credits.
Analysis of interrelationships of learning difficulties in language arts areas and procedures for remediation. Prerequisites: T&L 530 and T&L 534.

T&L 536. Innovations in English Language Arts Instruction. 3 Credits.
This course considers the current curricular trends and research-based best practices in teaching English Language Arts. Students will critically examine and apply current instructional approaches in teaching English language and vocabulary, classroom discourse practices, and digital literacies. We will consider the ways various instructional methods support the advancement of literacy development for all students, considering ways to modify and adapt curriculum to meet the cultural and linguistic diversity of today's classrooms. On demand.

T&L 537. ELL Methods and Materials. 3 Credits.
This course explores current methods and materials in ELL education, with a focus on teaching academic language and sheltered content instruction. F.S,SS.

T&L 538. Supervision of Student Teaching. 2 Credits.
For supervisors and directors of student teaching in colleges and cooperating schools. Principles and practices on how to provide the most beneficial experiences for student teachers.

T&L 539. College Teaching. 3 Credits.
Explores learning styles and teaching styles, the components and responsibilities involved in college teaching, methods of teaching and motivating students, and current issues related to instruction in the college classroom.

T&L 540. Theory and Philosophies of Curriculum in Schools. 3 Credits.
This course explores the historical development of the K-12 curriculum, the philosophical and theoretical aspects applied to curriculum, and the social conditions that impact curriculum.

T&L 541. History of Higher Education in the United States. 3 Credits.
Study of major events and people shaping higher education in the U.S. Role, philosophy, and organization of institutions of higher education discussed.

T&L 542. Models of Teaching. 3 Credits.
This course focuses on various models of teaching; social interaction, information-processing, inquiry and behavioral. The purpose of the course is to provide teachers with a variety of instructional models related to meaningful learning experiences for students.
T&L 543. Scholarly Writing. 3 Credits.
Designed to assist students with learning the art of scholarly writing, this course will aid students in designing, formatting, and completing research-based and other scholarly writing projects, as well as understanding the rules and norms of academic publishing.

T&L 544. Assessment in Higher Education. 3 Credits.
A wide range of assessment issues in higher education will be explored. This includes course, program, and institutional assessment as well as classroom assessment techniques. Students will examine and understand the assessment process.

T&L 545. Adult Learners. 3 Credits.
This course will cover theories of adult development, current research on adult learners, ways of assessing the needs and interests of adult learners, and ways of creating environments in which adult learners can thrive.

T&L 546. College Students with Special Needs. 3 Credits.
This course explores the range of special needs college students bring to campus and how faculty, staff, and administrators might appropriately meet those needs. Prerequisite: Admission to the School of Graduate Studies or instructor permission. S.

T&L 547. Technology in Higher Education. 3 Credits.
Students will examine the various uses and integration of technology and media in higher education by faculty in their attempt to engage learners with each other, the course content, and with instructors.

T&L 548. The Professoriate. 3 Credits.
This course is a study of the development of the American professorate by way of historical, scholarly, popular, and contemporary perspectives. It also examines the transition of new faculty members to their initial academic appointment.

T&L 549. Seminar. 1-4 Credits.
The seminar will focus on a specific topic relating to teaching and learning. The specific content will vary depending upon student needs and faculty resources. Repeatable. S/U grading.

T&L 550. Assessment and Evaluation in ELL Education. 3 Credits.
This course combines readings and theoretical discussion of assessment with hands-on experience in assessing ELLs. Students will learn how to use a variety of formal and informal assessments with a focus on how to use assessment data in planning instruction. Topics will include classroom-based assessments, language proficiency testing, testing accommodations for ELLs, and assessment of ELLs for special education and gifted education, and ELL program evaluation.

T&L 551. Second Language Acquisition for ELL Teachers. 3 Credits.
This course will explore the socio- and psycho-linguistic aspects of interlanguage by studying the theories and research of first and second language acquisition. Students will examine the nature of learners and their individual differences during the stages of language development, with a focus on children and K-12 classrooms.

T&L 553. Collaborative Relationships: Home, School and Community. 3 Credits.
A course appropriate for anyone working with families, early childhood educators, general educators, special educators, related service personnel, administrators and outside agency personnel. Topics covered include: (1) the various models of collaboration and consultation and the stages of each; (2) communication skills; (3) problem-solving; (4) conflict management; (5) diverse perspectives; (6) information collection procedures; (7) supervisory skills; (8) family characteristics and structure across the lifespan; (9) family focused intervention; (10) school choices; and (11) school issues such as poverty, domestic violence, teasing, bullying, and school violence.

T&L 558. Middle School Science and Engineering Lab1:Solids. 2 Credits.
T&L 559A. MS Sci.Eng-2: Solids. 3 Credits.
Prerequisites: T&L 558, admission to Graduate School, ND Teacher licensure and Admission to program "Improving Math and Science Literacy of Middle and High School Students of North Dakota Through Teacher-Faculty Partnerships".

T&L 559B. MS Sci.Eng-2: Solids. 3 Credits.
Prerequisites: T&L 558, admission to Graduate School, ND Teacher licensure and Admission to program "Improving Math and Science Literacy of Middle and High School Students of North Dakota Through Teacher-Faculty Partnerships".

T&L 560. Brain in Memory and Learning. 3 Credits.
Prerequisite: Admissions to Grad School.

T&L 562. MS Sci.Eng-4: Liquid/Gas. 3 Credits.
T&L 563. Middle School Science and Engineering Lab2:Liq/Gas. 2 Credits.
Prerequisite: T&L 562.

T&L 567. Language Structure and Analysis for ELL Teachers. 3 Credits.
T&L 568. Research and Advocacy in TESOL. 3 Credits.
T&L 569. Action Research. 3 Credits.
T&L 574. MS Sci.Eng-4: Liquid/Gas. 3 Credits.
Prerequisites: T&L 567, admission to Graduate School, ND Teacher licensure and Admission to program "Improving Math and Science Literacy of Middle and High School Students of North Dakota Through Teacher-Faculty Partnerships".

T&L 575. Middle School Science and Engineering Lab3:Mot/Elec. 2 Credits.
T&L 576A. MS Sci.Eng.-6:Motion/Electric. 3 Credits.
Prerequisites: T&L 575, admission to Graduate School, ND Teacher Licensure and employment as a teacher in a ND school.

T&L 576B. MS Sci.Eng.-6:Motion/Electric. 3 Credits.
Prerequisite: T&L 576A.

T&L 577. Assessment of Learning. 3 Credits.
This course addresses the theory and practice of assessment, specifically the process of gathering and discussing information from multiple and diverse sources in order to develop a deep understanding of what students know, understand, and can do with their knowledge as a result of educational experiences.

T&L 579. Classroom Based Inquiry. 3 Credits.
Concepts learned in T&L 579 will be used in-depth and theoretical constructs such as Living Theory, Self Study, and Critical Theory constructs will be studied. Students plan and conduct an in-depth inquiry project within a school setting, complete the associated IRB, and create and academic poster and/or prepare a proposal of the Inquiry project for a professional setting. Prerequisites: TL graduate status and T&L 569; or by permission of instructor. F.S.

T&L 580. Practicum in Schools. 1-4 Credits.
Practicum in study of desirable school practices, observations in nearby schools, and application of research findings in solving practical problems. Prerequisites: Appropriate foundational and major area courses, and consent of the instructor and advisor. Repeatable.

T&L 581. Resident Internship. 4 Credits.
A full-time, year-long internship experience conducted in a cooperating school district. Interns are assigned as members of instructional teams with full responsibility for a portion of the cooperating school's instructional program. Prerequisites: Participation in the summer program prior to the internship and teaching licensure (see dept for approval).

T&L 582. Resident Internship. 4 Credits.
A full-time, year-long internship experience conducted in a cooperating school district. Interns are assigned as members of instructional teams with full responsibility for a portion of the cooperating school's instructional program. Prerequisites: Participation in the summer program prior to the internship and teaching licensure (see dept for approval).

T&L 583. Reading Clinic. 2 Credits.
T&L 594. Internship in Education. 1-8 Credits.
This is a culminating experience primarily for Sixth year and Doctoral students. The internships will be identified in one of the following sub-areas: (A) Educational Administration, (B) Special Education, (C) Curriculum, (D) Educational Research, or (E) Teacher Education. Prerequisites: Appropriate foundational, cognate, and major area coursework and consent of advisor and instructor. Repeatable.

T&L 589. Professional Development: Resident Teacher Program. 2 Credits.
This field-based experience provides mentoring and coaching, translates baccalaureate theory and research into practice, and requires active participation in the school placement and classroom setting. Issues and topics relevant to first year teachers and graduate education are emphasized through field work and discussions. Prerequisite: Admission into the Elementary Education Resident Teacher Program. SS.

T&L 590. Special Topics. 1-4 Credits.
Exploration of special topics in the study of education not regularly included in available course offerings. May be repeated for different topics. Prerequisite: Consent of instructor or advisor. Repeatable.

T&L 591. Readings in Education. 1-4 Credits.
Designed primarily for advanced graduate students. May be repeated for different topics. Prerequisite: Consent of instructor and advisor. Repeatable.

T&L 593. Independent Projects. 1-4 Credits.
Repeatable.

T&L 596. Individual Research in Education. 1-4 Credits.
Prerequisite: Consent of instructor and advisor. Repeatable.

T&L 995. Scholarly Project. 2 Credits.
The scholarly project demonstrates critical analysis and application of information and experiences gained throughout the program of study. The project allows students to demonstrate scholarly skills in an integrated manner that is directly related to their roles as teachers, program evaluators, and action researchers. The scholarly project must be approved by the student's adviser.

T&L 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

T&L 997. Independent Study. 2 Credits.

T&L 998. Thesis. 1-9 Credits.
Repeatable to 9 credits.

T&L 999. Dissertation. 1-15 Credits.
Repeatable to 15 credits.

Undergraduate Courses for Graduate Credit

T&L 322. Administration and Leadership in Early Childhood Education. 3 Credits.
An investigation of patterns of administration, curriculum organization, spatial resources, and staffing in early childhood settings, serving children 0-8 years old. Topics include federal and state laws and emerging trends in preschool and primary education in the state, region, and nation. Sixteen (16) hours of field experience. Prerequisite: Admission to the Teacher Education program. S.

T&L 422. Development of the Gifted and Talented. 2 Credits.
Research and theory for understanding the development needs of the more able child in early childhood and in educational experiences. S.

T&L 423. Assessment and Individualized Planning in Special Education. 3 Credits.
A study of the principles and practices of: (1) obtaining diagnostic information on school-related problems of a student; (2) assimilating this information and prescribing appropriate alterations based on continuous measurement data. Prerequisites or Corequisites: TL 315 and T&L 319. F,S.

T&L 493. Workshop. 1-4 Credits.
Special problems in Special Education; consideration of special problems of concern to the Special Education teacher and other educators. Repeatable to 8 credits. F,S.

Master of Education in ELL Education

Admission Requirements
The applicant must meet the School of Graduate Studies' current minimum general admission requirements as published in the graduate catalog.

1. An undergraduate degree in education, or a related field.
2. A cumulative Grade Point Average (GPA) of at least 2.75 for all undergraduate work or a GPA of at least 3.0 for the junior and senior years of undergraduate work (based on A = 4.00).
3. Satisfy the School of Graduate Studies' English Language Proficiency requirements as published in the graduate catalog.
4. Students currently enrolled in UND's Graduate Certificate in ELL Program who want to transfer to the M.Ed. in ELL Education program must apply for admission to the M.Ed. program. Students who have completed the Graduate Certificate have two years from the date of certificate completion to be apply and be accepted into the M.Ed. program and have their certificate courses credited towards the M.Ed. degree.

Master of Education (M.Ed.)
This degree is the highest academic credential normally held by teachers in the TESOL field. While the program focuses on K-12 education in the United States, the program is also responsive to those planning to teach adult ESL or teach English overseas. The program may be completed in six semesters. A 90-hour field experience is required in addition to a final scholarly project or independent study.

Degree Requirements

1. Thirty-five (35) credits including a minimum of twelve in the major, six in a cognate area, and six in foundations.
2. A minimum of two credits of Independent Study or Scholarly Project.
3. At least one-half of the credits must be at or above the 500- level.
4. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.
5. Preparation of a written independent study or scholarly project approved by the faculty advisor.
6. Required Courses:
7. Major
T&L 523  Literacy Instruction for English Language Learners 3
T&L 514  Introduction to Multilingual Education 3
T&L 537  ELL Methods and Materials 3
T&L 550  Assessment and Evaluation in ELL Education 3
T&L 568  Research and Advocacy in TESOL 3
T&L 580  Practicum in Schools 3
T&L 995  Scholarly Project or T&L 997  Independent Study 2

Cognate
T&L 513  Linguistics for ELL Teachers 3
T&L 567  Language Structure and Analysis for ELL Teachers 3
T&L 551  Second Language Acquisition for ELL Teachers 3

Foundations
EFR 500  Introduction to the Foundations of Education 3
EFR 506  Multicultural Education 3

Total Credits: 35

Higher Education

M.S. in Higher Education (p. 415)
Ed.D. in Higher Education (p. 414)
Ph.D. in Higher Education (p. 414)
Courses

HE 501. Introduction to Higher Education. 3 Credits.
An overview of administration of America's colleges and universities. Topics include roles of state and federal government, governing boards, institutional organization and culture, types of institutions, faculty, students, research about higher education, and the profession of administrator. On demand.

HE 503. Diversity Across Higher Education. 3 Credits.
The course intends to promote understanding of the diverse populations within higher education and to encourage students to examine their own attitudes regarding diversity and openness to other cultures. Examination of practices and models for service delivery to diverse populations will help prepare students to develop management, leadership, and advocacy skills. The course will underscore the development of skills for working with individuals, small groups, and campus groups in relation to equity, diversity, and inclusion. On demand.

HE 505. The College Student. 3 Credits.
This course will examine the theoretical perspectives that describe students' growth throughout the late adolescent and adult life span. The course will look at theory in the areas of intellectual, moral, ego, psychosocial, career, and spiritual development. Further, the course will examine sources of identity including gender, race, culture, ethnicity, and sexual identity. On demand.

HE 507. Collegiate Environments. 3 Credits.
The course will discuss how student characteristics influence student educational and development needs, and the effects of the college experience on student learning and development. This course also will examine collegiate environments and how students’ person-environment interactions affect their development. On demand.

HE 509. Higher Education Management. 3 Credits.
This course will examine the administrative functions of higher education including student affairs, academic affairs, institutional advancement, and administrative services. Students will be introduced to professional issues, ethics, standards of practice, and the legal environment. On demand.

HE 511. Program Development. 3 Credits.
This course will examine the learning theories that undergird the design and delivery of educational programs and services. Students will acquire the knowledge and skills needed to conduct needs assessments and outcomes assessments in-person and mediated environments. They will also learn and demonstrate program planning, development and implementation process. On demand.

HE 513. College Students and the Law. 3 Credits.
This course provides an overview of key legal issues that pertain to college students. Using a legal frame and analysis, the focus of the course surrounds administrative decision making, effective practices, and organizational policy design and implementation. On demand.

HE 529. Capstone Seminar. 1 Credit.

HE 532. Principles and Practices in Higher Education. 3 Credits.
This course is designed for students newly admitted to the doctoral program in higher education. It introduces the students to the study of higher education enterprise in terms of its context, research, and practice. Among the topics covered, students in the course will explore the significance of institutional missions and purposes, federal and state governments, and the academic community. On demand.

HE 536. Leading and Learning in Higher Education. 3 Credits.
Colleges and universities are complex organizations with a core purpose of learning. An understanding of organizations, what they are and how they function is critical to success as a higher education professional. Further each member of the organization is called on to provide leadership for the organization in the classroom, the department, and other organizational units. Effective leaders will understand the organization and how their roles and work help support the institution's effectiveness in educating students. On demand.

HE 538. College Student Experiences. 3 Credits.
Given the growing awareness, economically, politically, and socially, of the need for students to succeed in college, faculty, staff, and administrators are increasingly being held accountable for college persistence and completion. A significant factor in students' success is their learning and development. Students in this course will explore concepts and theories related to student learning and development and be challenged to interpret and apply theories to real-world higher education practice, considering how these processes influence student success. On demand.

HE 549. Dissertation Orientation. 3 Credits.
This course introduces students to the dissertation process, focusing specifically on proposal formulation. S/U grading. On demand.

HE 561. Curriculum in Higher Education. 3 Credits.
A study of processes for planning, implementing, and evaluating curriculum within institutions of higher education. Topics will include historical perspectives on curriculum in higher education, governance systems related to curriculum development and adoption, and issues of current interest and concern. On demand.

HE 563. Academic Administration in Higher Education. 3 Credits.
The roles and responsibilities of academic administration in higher education. Topics include the major academic roles (chairperson, dean, chief academic officer), curriculum and instruction, program evaluation, assessment, planning, faculty workload and evaluation, and the profession of administrator. On demand.

HE 564. Higher Education Student and Support Services. 3 Credits.
An overview of the organization and functions of student and support services within institutions of higher education. Students will gain an understanding of the administrative issues related to career services, student counseling, enrollment services, student activities, health services, student organization, and other institutional units, which serve the needs of students at a college or university. On demand.

HE 569. Higher Education Diversity Systems and Policy. 3 Credits.
The course is designed to provide students with a critical understanding of issues of diversity in higher education from an institutional and systematic perspective. Multiple levels and dimensions of diversity will be discussed, including structural, institutional and systematic manifestations of how diversity and equity are historically and currently addressed. Institutional type and role will also be explored. On demand.

HE 570. Higher Education Law. 3 Credits.
An overview of the legal issues that confront college and university personnel. Pertinent federal and state statutes as well as case law will be used to instruct about legal rights and responsibilities of university/college administrators and students. The legal relationships between the institution and the faculty, the student, state government, and the federal government will be explored. On demand.

HE 573. Higher Education and Public Policy. 3 Credits.
The course addresses the development, analysis, and implementation of public policy in postsecondary education and the structures and actors involved in policy activity. The course will also introduce students to current and ongoing postsecondary public policy issues at the state, national, and international levels. On demand.

HE 576. Higher Education Planning and Finance. 3 Credits.
Higher education must plan to ensure the future of the institution and those plans guide the allocation of resources to accomplish the institutional mission and plan. This course will provide an overview of planning processes and the subsequent allocation of resources to implement the plan. Students will also learn about financial management including budgeting, financial policies and performance metrics. The college administrator's role in guiding the fiscal welfare of an institution of higher education will be explored. On demand.

HE 579. Special Topics in Higher Education. 1-3 Credits.
Exploration of special topics in the study of education not regularly included in available course offerings. May be repeated for different topics . Prerequisite: Consent of instructor or advisor. Repeatable.

HE 591. Practicum in Higher Education. 1-4 Credits.
Students will complete projects to further student learning through course design, teaching, and assessment. Repeatable up to a maximum of 8 credits. Prerequisite: Consent of advisor and instructor. Repeatable to 8 credits. On demand.

HE 592. Internship in Higher Education. 1-8 Credits.
This is a professional practice experience in an administrative unit. May be repeated to a maximum of 8 credits. Prerequisites: Consent of advisor and instructor. Repeatable to 8 credits. On demand.

HE 594. Readings in Higher Education. 1-4 Credits.
Designed primarily for advanced graduate students. May be repeated for different topics to a maximum of 9 credits. Prerequisites: Consent of advisor and instructor. Repeatable to 9 credits. On demand.
HE 595. Higher Education Seminar. 1-9 Credits.
A seminar for advanced graduate students on a focused topic. Students will have significant responsibility for preparing and presenting papers and studies on the focus topic. May be repeated to a maximum of 9 credits. Prerequisites: Consent of the instructor and advisor. Repeatable to 9 credits. S/U grading. On demand.

HE 597. Administrative Project in Higher Education. 1-4 Credits.
For advanced graduate students. Students will undertake an assignment from an administrator for a project that will be implemented once it is completed. Repeatable to a maximum of 4 credits. Prerequisites: Consent of advisor and instructor. Repeatable to 4 credits. On demand.

HE 598. Individual Research in Higher Education. 1-9 Credits.
Students design a research study, implement the research plan, and/or publish the results of the project. May be repeated to a maximum of 9 credits. Prerequisites: Consent of advisor and instructor. Repeatable to 9 credits.

HE 995. Scholarly Project. 2 Credits.
Prerequisite: Consent of advisor. On demand.

HE 996. Continuing Enrollment. 1-12 Credits.
Repeatable to a maximum of 48 credits. Prerequisite: Consent of the advisor. Repeatable. S/U grading.

HE 997. Independent Study. 2 Credits.
Prerequisite: Consent of the advisor.

HE 998. Thesis. 1-9 Credits.
Prerequisite: Consent of the advisor. Repeatable to 9 credits.

HE 999. Dissertation. 1-12 Credits.
Students work on the dissertation/doctoral capstone project. Prerequisite: Consent of the advisor. Repeatable to 12 credits. F,S,SS.

Doctor of Education in Higher Education

Admission Requirements
The following criteria will be used to assess a student’s application for admission into the doctoral programs in the Department of Educational Leadership. No single criterion can adequately predict a student’s probable success in graduate work; as such, candidates for admission to the doctoral programs are evaluated on the following criteria:

1. A bachelor’s degree from an accredited college or university.
2. Completion of a master’s degree from an accredited college or university
3. Grade point average from all previous graduate work (minimum of 3.5 required)
4. Professional resume
5. Educational leadership essay
6. Statement of professional goals
7. Writing sample
8. Three (3) letters of recommendation
9. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as listed in the Graduate Academic Information section.
10. Students who have received a bachelor’s degree or higher from the United States or English-speaking Canada are not required to submit the TOEFL

Degree Requirements
Students seeking the Doctor of Education degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Educational Leadership Department.

The Ed.D. program in Higher Education is designed primarily for practitioners preparing for college and university administration positions.

1. A minimum of 96 semester credit hours of course work beyond the bachelor’s degree.
2. Maintenance of at least a 3.0 GPA for all classes completed as a graduate student.
3. Completion of a dissertation, which incorporates independent work that is an original contribution to knowledge.
4. With approval of a student’s Faculty Advisory Committee, up to 30 credits from a master’s degree may be transferred from another institution.
5. Successful completion of comprehensive examinations in Educational Leadership and Educational Foundations and Research.
6. Successful completion of a final examination.

Required Courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minor/Master's transfer credits (30 credits)</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Higher Education Common Core (18 credits):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HE 532</td>
<td>Principles and Practices in Higher Education</td>
<td>3</td>
</tr>
<tr>
<td>HE 536</td>
<td>Leading and Learning in Higher Education</td>
<td>3</td>
</tr>
<tr>
<td>HE 538</td>
<td>College Student Experiences</td>
<td>3</td>
</tr>
<tr>
<td>HE 549</td>
<td>Dissertation Orientation</td>
<td>2</td>
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<tr>
<td>T&amp;L 541</td>
<td>History of Higher Education in the United States</td>
<td>3</td>
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<tr>
<td>T&amp;L 543</td>
<td>Scholarly Writing</td>
<td>3</td>
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<tr>
<td>Educational Foundations (12 credits):</td>
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<td></td>
</tr>
<tr>
<td>Advanced Foundations elective 1</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Advanced Foundations elective 2</td>
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<td>Advanced Foundations elective 3</td>
<td>3</td>
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</tr>
<tr>
<td>Advanced Foundations elective 4</td>
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</tr>
<tr>
<td>Scholarly Tools (6 credits):</td>
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</tr>
<tr>
<td>(Prerequisite: EFR 515 or equivalent)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EFR 510</td>
<td>Qualitative Research Methods</td>
<td>3</td>
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<tr>
<td>EFR 516</td>
<td>Statistics II</td>
<td>3</td>
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<tr>
<td>Administration Emphasis (20 credits):</td>
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<tr>
<td>Core (9 credits):</td>
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<tr>
<td>HE 563</td>
<td>Academic Administration in Higher Education</td>
<td>3</td>
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<tr>
<td>HE 570</td>
<td>Higher Education Law</td>
<td>3</td>
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<tr>
<td>HE 576</td>
<td>Higher Education Planning and Finance</td>
<td>3</td>
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<tr>
<td>Electives (11 credits):</td>
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<tr>
<td>Selected with consent of advisor</td>
<td>11</td>
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</tr>
<tr>
<td>OR</td>
<td></td>
<td></td>
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<tr>
<td>Individualized Emphasis (20 credits):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electives selected with consent of advisor and faculty from area of specialization</td>
<td>20</td>
<td></td>
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<tr>
<td>Dissertation</td>
<td>10</td>
<td></td>
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<tr>
<td>Total Credits</td>
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</tbody>
</table>

Doctor of Philosophy in Higher Education

Admission Requirements
The following criteria will be used to assess a student’s application for admission into the doctoral programs in the Department of Educational Leadership. No single criterion can adequately predict a student’s probable success in graduate work; as such, candidates for admission to the doctoral programs are evaluated on the following criteria:
1. Completion of a master's degree from an accredited college or university
2. Grade point average from all previous graduate work (minimum of 3.5 required)
3. Professional resume
4. Educational leadership essay
5. Statement of professional goals
6. Writing sample
7. Three (3) letters of recommendation
8. Satisfy the School of Graduate Studies' English Language Proficiency requirements as published in the graduate catalog.
9. Students who have received a bachelor's degree or higher from the United States or English-speaking Canada are not required to submit the TOEFL.

Degree Requirements

Students seeking the Doctor of Philosophy degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Educational Leadership Department.

The Ph.D. program in Higher Education is designed for students preparing for positions in which research and creative experience are predominant interests. Ph.D. candidates are expected to have undertaken and completed independent research leading to an original contribution of knowledge in the field. It is generally expected that the Ph.D. dissertation will be publishable. This degree option typically provides preparation for those who aspire to leadership positions in higher education, in government agencies, or in other educational policy organizations.

1. A minimum of 90 semester credit hours of course work beyond the bachelor's degree.
2. Maintenance of at least a 3.0 GPA for all classes completed as a graduate student.
3. Completion of a dissertation, which incorporates independent work that is an original contribution to knowledge.
4. With approval of a student's Faculty Advisory Committee, up to 30 credits from a master's degree may be transferred from another institution.
5. Successful completion of comprehensive examinations in Educational Leadership and Educational Foundations and Research.
6. Successful completion of a final examination.

Minor/Master's transfer credits (24 credits) 24

Higher Education Common Core (18 credits):
- HE 532 Principles and Practices in Higher Education 3
- HE 536 Leading and Learning in Higher Education 3
- HE 538 College Student Experiences 3
- HE 549 Dissertation Orientation 2
- T&L 541 History of Higher Education in the United States 3
- T&L 543 Scholarly Writing 3

Educational Foundations (6 credits):
(Prerequisite: EFR 500 or equivalent)
- Advanced Foundations elective 1 3
- Advanced Foundations elective 2 3

Scholarly Tools (12 credits):
(Prerequisite: EFR 515 or equivalent)
- EFR 510 Qualitative Research Methods 3
- EFR 516 Statistics II 3
- Advanced Scholarly Tool elective 1 3
- Advanced Scholarly Tool elective 2 3

Administration emphasis (18 credits):
Core (9 credits):
- HE 563 Academic Administration in Higher Education 3
- HE 570 Higher Education Law 3
- HE 576 Higher Education Planning and Finance 3
Electives (9 credits):
- Selected with consent of advisor 9

Individualized emphasis (18 credits):
Electives selected with consent of advisor and faculty from area of specialization 18
- Dissertation 12

Master of Science in Higher Education

Admission Requirements

1. A bachelor's degree from an accredited college or university.
2. A cumulative undergraduate GPA of 2.75 or at least 3.00 for the last two years. Typically, applicants with teaching experience in schools apply to the M.Ed. program, not the M.S. program.
3. Satisfy the School of Graduate Studies' English Language Proficiency requirements as published in the Graduate Catalog.
4. Students who have received a bachelor's degree or higher from the United States or English-speaking Canada are not required to submit the TOEFL.
5. All applicants are required to respond to essay questions provided in the application, submit a resume and writing sample.

Degree Requirements

1. A bachelor's degree from an accredited college or university.
2. A cumulative undergraduate GPA of 2.75 or at least 3.00 for the last two years. Typically, applicants with teaching experience in schools apply to the M.Ed. program, not the M.S. program.
3. Satisfy the School of Graduate Studies' English Language Proficiency requirements as published in the Graduate Catalog.
4. Students who have received a bachelor's degree or higher from the United States or English-speaking Canada are not required to submit the TOEFL.
5. All applicants are required to respond to essay questions provided in the application, submit a resume and writing sample.

Required Courses:

Core Courses/Experiences:
- HE 501 Introduction to Higher Education 3
- HE 503 Diversity Across Higher Education 3
- HE 505 The College Student 3

Educational Foundations & Research:
- EFR 500 Introduction to the Foundations of Education 3
- EFR 509 Introduction to Applied Educational Research 3
- T&L 541 History of Higher Education in the United States 3

Integrative Learning Experiences:
- HE 529 Capstone Seminar 1
- HE 997 Independent Study 2

Electives (Sampling of Potential Electives):
- HE 507 Collegiate Environments 3
- HE 509 Higher Education Management 3
HE 511 Program Development 3
HE 513 College Students and the Law 3
HE 592 Internship in Higher Education 1-8

Total Credits 34-41

**Instructional Design and Technology**

M.S. in Instructional Design & Technology (p. 418)
M.Ed. in Instructional Design & Technology (p. 417)

IDT Graduate Certificate in K-12 Technology Integration (http://und-public.courseleaf.com/graduateacademicinformation/departmentalcoursesprograms/education/idth-cert-te)

IDT Graduate Certificate in Corporate Training and Performance (http://und-public.courseleaf.com/graduateacademicinformation/departmentalcoursesprograms/education/idth-cert-ctp)

IDT Graduate Certificate in eLearning (http://und-public.courseleaf.com/graduateacademicinformation/departmentalcoursesprograms/education/idth-cert-el)

Cognate/Minor in Instructional Design and Technology (http://und-public.courseleaf.com/graduateacademicinformation/departmentalcoursesprograms/education/instructionaldesigntechnology/idth-minor)

**Courses**

**IDT 500. Survey of Instructional Design. 3 Credits.**
This course provides students with an in-depth overview of the field of Instructional Technology. Topics include the history and critical issues of the field; a description of instructional design; applications of instructional technology, and associated areas of research.

**IDT 510. Technology-Based Instruction: Applications and Methods. 3 Credits.**
A study of the various methods for using technology to deliver and/or support instruction: tutorials, drills, simulation, interactive video, instructional games, intelligent computer-based instruction, performance support systems, job aids, testing, distance learning, intelligent tutoring systems, and instructional management systems.

**IDT 520. Instructional Systems Analysis and Design. 3 Credits.**
The first course in a two-course required sequence. IDT 520 is a study of methodologies for analyzing and designing instruction. Topics include needs analysis, job/task analysis, and assessment of instructional outcomes. IDT 525 is the second required course in this two-course sequence.

**IDT 525. Development, Implementation, and Evaluation of Instructional Materials. 3 Credits.**
This course focuses on the development, implementation, and evaluation of instructional materials that have been created according to instructional design principles. The second course in a two-course sequence, this course completes the instructional design process begun in IDT 520. After completing this two-course sequence, students will have the skills needed to conduct the full instructional design process in a variety of settings, and with a variety of learners, audiences, and domains. Prerequisites: Program major or permission of instructor; IDT 520.

**IDT 530. Introduction to Computer-Based Instruction. 3 Credits.**
An examination of the technology (hardware and software) for developing and delivering computer-based instruction (CBI). A study of the characteristics of high-quality CBI, addressing such topics as program structure, user interface, navigation, message/screen design, use of graphics, response analysis, feedback strategies, error checking, branching, and computer-managed instruction. Prerequisite: IDT 520.

**IDT 535. Advanced Computer-Based Instructional Development. 3 Credits.**
This course is designed to extend the CBT/CBI design and development skills acquired in IDT 530. Students will study advanced CBT/CBI techniques and applications such as artificial intelligence, intelligent tutoring systems, electronic performance support systems, authoring tools, learning objects, pedagogical agents, SCORM compliant programming, simulations and games, the use of CBT/CBI for research purposes, and learning management systems (LMS). In addition to studying these areas, students will build a CBT/CBI unit that implements one or more of these applications. Prerequisites: Program Major; IDT 530.

**IDT 540. Digital Media and the Internet in Schools. 3 Credits.**
This course builds on the theories and approaches to technology integration first introduced in IDT 510. Students will gain practice developing lesson plans and examples of student artifacts with specific media such as digital video, digital audio, digital photography, and the Internet. Students will gain competency in generating and using media according to the principles of technology integration, rather than technology use. Prerequisites: IDT 510 and IDT 520.

**IDT 545. Instructional Simulations and Games. 3 Credits.**
This course provides an in-depth study of the theoretical, philosophical, and practical issues surrounding the use of simulations and games in learning environments. Methods and approaches for integrating commercial games into learning environments and for developing new simulations and games around content will be examined. Prerequisite: Program major or permission of instructor.

**IDT 549. Graduate Seminar in Instructional Design and Technology. 3 Credits.**
Seminar on critical reading and writing related to scholarship in the field of Instructional Design and Technology. Prerequisite: Program major or permission of instructor.

**IDT 550. Theories and Models of Instructional Design. 3 Credits.**
This course focuses on pedagogical theories from education and psychology as they relate to instructional design, and on alternate models of instructional design. Topics include epistemological views of knowledge, major schools of thought on the nature of learning, a survey of instructional and learning theories, and a survey of instructional design models. Particular emphasis is placed on the interrelation of theories, models, and practice in the field of instructional design. Prerequisite: Program major or permission of instructor.

**IDT 560. Instructional Design Consulting. 3 Credits.**
This course trains students in the theoretical, (e.g., needs analysis, change agency, data-driven decisions, solution specification) and practical (e.g., management of client relationship, project management skills, budgeting) of instructional design consulting. Role-play, response to an RFP, and discussion of modern approaches to managing the consulting process will be primary activities in this course. Prerequisites: Program major or permission of instructor; IDT 520.

**IDT 570. Human Performance Technology. 3 Credits.**
An overview of the Human Performance Improvement (HPI) and Human Performance Technology (HPT) models and processes. Particular emphasis on determining whether instructional interventions or performance improvement interventions are called for, models and techniques for identifying performance gaps, specifying solutions, measuring results, and managing or adjusting the improvement. Job aids, electronic performance support systems, authoring tools, and other performance technologies will be covered. Prerequisites: IDT 500 and IDT 520.

**IDT 580. Introduction to Web-Based Instruction. 3 Credits.**
This course trains students to design and develop web-based instruction, including basic web site design tools and theory, design and development of online learning with course management systems, supporting technologies in web-based instruction, pedagogical approaches to the design and development of online learning environments. Prerequisites: Program major or permission of instructor; IDT 520.

**IDT 584. Internship in Instructional Design and Technology. 2-4 Credits.**
The internship is a culminating experience in which the student assumes responsibility for an instructional design and technology project. Repeatable to 4 credits. Repeatable to 4 credits.
IDT 590. Special Topics in Instructional Design and Technology. 1-3 Credits.
An in-depth study of a selected topic in instructional design and technology.
Topics will vary with faculty expertise and current issues. Some topics
would include simulations, instructional applications of the World Wide Web,
performance support systems, adaptive testing, intelligent tutoring systems,
and hypermedia applications. Repeatable to 3 credits.

IDT 591. Readings in Instructional Design and Technology. 1-3 Credits.
Selected readings with oral and written reports.

IDT 592. Research in Instructional Design and Technology. 1-3 Credits.
Supervised research in areas of student interest. Repeatable to 3 credits.

IDT 593. Directed Studies in Instructional Design and Technology. 1-3 Credits.
Individual project work in the design and development of technology-based
instruction. All projects will require a final report. Repeatable to 3 credits.
Repeatable to 3 credits.

IDT 995. Scholarly Project. 2 Credits.
The scholarly project demonstrates critical analysis and application of
information and experiences gained throughout the program of study.

IDT 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

IDT 997. Independent Study. 2 Credits.
The independent study requires the student to investigate a topic related
to the major field of study and to prepare a formal report summarizing this
investigation.

IDT 998. Thesis. 4-9 Credits.
The thesis is an original research project completed. Repeatable to 9 credits.
Repeatable to 9 credits.

Instructional Design and Technology Graduate Certificates

IDT offers three 12-credit certificates. The certificates provide minimum
competencies in the field of instructional design within a given subset of the
field (technology integration, corporate training, or eLearning). Certificates
are intended for those already working in some capacity as an instructional
designer but who lack an advanced degree in instructional design. Those
seeking the full set of professional competencies of an instructional designer
across all areas in preparation for entering the field of instructional design are
encouraged to apply to one of the IDT master’s programs instead. Courses
taken for a certificate may also be transferred into any of the IDT master’s
programs at a later date.

IDT Certificate in K-12 Technology Integration
Required Courses (6 credits):

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDT 520</td>
<td>Instructional Systems Analysis and Design</td>
<td>3</td>
</tr>
<tr>
<td>IDT 525</td>
<td>Development, Implementation, and Evaluation of Instructional Materials</td>
<td>3</td>
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</table>

Two Additional Courses from the Following (6 credits):

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>IDT 510</td>
<td>Technology-Based Instruction: Applications and Methods</td>
<td>3</td>
</tr>
<tr>
<td>IDT 540</td>
<td>Digital Media and the Internet in Schools</td>
<td>3</td>
</tr>
<tr>
<td>IDT 545</td>
<td>Instructional Simulations and Games</td>
<td>3</td>
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</table>

Total credits 12

IDT Certificate in eLearning
Required Courses (6 credits):

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDT 520</td>
<td>Instructional Systems Analysis and Design</td>
<td>3</td>
</tr>
<tr>
<td>IDT 525</td>
<td>Development, Implementation, and Evaluation of Instructional Materials</td>
<td>3</td>
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Two Additional Courses from the Following (6 credits):

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</table>

Total credits 12

IDT Certificate in Corporate Training and Performance
Required Courses (6 credits):

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDT 520</td>
<td>Instructional Systems Analysis and Design</td>
<td>3</td>
</tr>
<tr>
<td>IDT 525</td>
<td>Development, Implementation, and Evaluation of Instructional Materials</td>
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Two Additional Courses from the Following (6 credits):

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>IDT 545</td>
<td>Instructional Simulations and Games</td>
<td>3</td>
</tr>
<tr>
<td>IDT 560</td>
<td>Instructional Design Consulting</td>
<td>3</td>
</tr>
<tr>
<td>IDT 570</td>
<td>Human Performance Technology</td>
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</tbody>
</table>

Total credits 12

Master of Education in Instructional Design and Technology

Admission Requirements

The applicant must meet the School of Graduate Studies’ current minimum
general admission requirements as published in the graduate catalog.

1. An overall undergraduate grade point average of 2.75 or a junior/senior
year grade point average of 3.00 for the Master of Education and Master of
Science degrees, and for the certificate programs.
2. A 3.5 or better grade point average for all graduate work.
3. Satisfy the School of Graduate Studies’ English Language Proficiency
requirements as listed in the Graduate Academic Information section of the
graduate catalog.
4. Two essay questions as part of the application process.

Provisional admission may be considered for students whose academic
performance does not meet these criteria. Whether such consideration is given
will depend on the circumstances and the judgment of the admissions faculty.

A basic knowledge of the microcomputer and substantial skill in using standard
applications to produce work products (word processing, spreadsheet, drawing/
painting, graphing, and other common applications).

Degree Requirements

Students seeking the MEd degree at the University of North Dakota must
satisfy all general requirements set forth by the School of Graduate Studies as
well as particular requirements set forth by the IDT program.

1. At least one-half of the credits must be at or above the 500 level.
2. A maximum of one-fourth of the credit hours required for the degree may
be transferred from another institution.

Required Courses

Core coursework in IDT 9
Additional coursework in IDT area of emphasis 6
Foundations coursework in education or psychology 6
Scholarly tools/research 3
Electives 6
Internship 2
Scholarly Project/Independent Study 2

Total Credits 34

The IDT degree options are based on the same set of program components:
1. **Program core component:** New courses presenting IDT content.
2. **Research component:** Development of research skills.
3. **Foundations component:** Fundamental background in psychology.
4. **Area of Emphasis in IDT:** Opportunity for area or skill specialization within IDT.

The IDT course requirements are organized within a major, foundations area, research/scholarly tools area, and area of emphasis. The major consists of the IDT core and the area of emphasis in IDT. Students in the MEd degree program will be required to complete 15 credit hours of coursework in IDT subject matter. This requirement includes:

### Core Coursework

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>IDT 500</td>
<td>Survey of Instructional Design</td>
<td>3</td>
</tr>
<tr>
<td>IDT 520</td>
<td>Instructional Systems Analysis and Design</td>
<td>3</td>
</tr>
<tr>
<td>IDT 525</td>
<td>Development, Implementation, and Evaluation of Instructional Materials</td>
<td>3</td>
</tr>
</tbody>
</table>

### Area of Emphasis

Select four of the following: 12

- IDT 550: Theories and Models of Instructional Design
- IDT 590: Special Topics in Instructional Design and Technology
- IDT 591: Readings in Instructional Design and Technology
- IDT 592: Research in Instructional Design and Technology
- IDT 593: Directed Studies in Instructional Design and Technology
- K-12 Emphasis:
  - IDT 510: Technology-Based Instruction: Applications and Methods
- IDT 540: Digital Media and the Internet in Schools
- Corporate Emphasis:
  - IDT 560: Instructional Design Consulting
  - IDT 570: Human Performance Technology
- Computer- and Web-Based Instruction:
  - IDT 530: Introduction to Computer-Based Instruction
  - IDT 535: Advanced Computer-Based Instructional Development
  - IDT 545: Instructional Simulations and Games
  - IDT 580: Introduction to Web-Based Instruction

### Foundations

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYC 501</td>
<td>Psychological Foundations Educ (Or any EFR Foundations course above (excluding) 500)</td>
<td>3</td>
</tr>
<tr>
<td>EFR 500</td>
<td>Introduction to the Foundations of Education</td>
<td>3</td>
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</table>

### Scholarly Tools

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>EFR 509</td>
<td>Introduction to Applied Educational Research</td>
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</table>

### Internship

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDT 584</td>
<td>Internship in Instructional Design and Technology</td>
<td>2-4</td>
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</tbody>
</table>

### Scholarly Project

Select one of the following:

- IDT 995: Scholarly Project 2
- IDT 997: Independent Study 2

**Total Credits:** 36-38

### Degree Delivery Options

The IDT master’s and certificate programs are available for on-campus and distance delivery, making it possible to attain these degrees via distance delivery, on-campus attendance, or a combination of both. Online students and on-campus students are peers in the same class sessions and experience the same educational opportunities. Courses typically have a few synchronous (live) class sessions, where students may attend on-campus in the actual classroom or they may participate through our distance delivery system. In this manner, class lectures, discussion, presentation, and collaboration are done seamlessly, in a nearly identical fashion to traditional classes.

Asynchronous sessions (those done at the time and place of the students’ choosing each week) are handled through a course management system. Students use these tools to read material loaded by the teacher, turn in assignments, communicate through message boards, participate in discussions through threaded discussion tools, take tests, and receive their grades. There are assignments and participation activities every week, whether the class meets live or not. This way, students get the best of both worlds: the flexibility of online learning and the personal contact and connection of face-to-face instruction.

### PhD Area of Emphasis in IDT

IDT also offers a doctorate through the Teaching and Learning PhD program, in which IDT is an area of emphasis. For details on this option, see the Teaching and Learning PhD (p. 384) program section in the graduate catalog.

### Master of Science in Instructional Design and Technology

#### Admission Requirements

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. An overall undergraduate grade point average of 2.75 or a junior/senior year grade point average of 3.00 for the Master of Education and Master of Science degrees, and for the certificate programs.
2. A 3.5 or better grade point average for all graduate work.
3. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.
4. Two essay questions as part of the application process.

Provisional admission may be considered for students whose academic performance does not meet these criteria. Whether such consideration is given will depend on the circumstances and the judgment of the admissions faculty.

#### Degree Requirements

Students seeking the MS degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the IDT program.

1. At least one-half of the credits must be at or above the 500 level.
2. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.

### Required Courses

- **Core coursework in IDT:** 9
- **Additional coursework in IDT area of emphasis:** 9
- **Foundations coursework in education or psychology:** 3
- **Scholarly tools/research electives:** 6
- **Electives:** 3
- **Internship:** 2
- **Scholarly project or thesis:** 2-4

**Total (34-thesis or 36-thesis):**

The IDT degree options are based on the same set of program components:

1. **Program core component:** New courses presenting IDT content.
2. **Research component:** Development of research skills.
3. **Foundations component:** Fundamental background in psychology.
4. **Area of Emphasis in IDT:** Opportunity for area or skill specialization within IDT.

The IDT course requirements are organized within a major, foundations area, research/scholarly tools area, and area of emphasis. The major consists of the IDT core and the area of emphasis in IDT. Students in the MS degree program will be required to complete 18 credit hours of coursework in IDT subject matter. This requirement includes:

### Core Coursework

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDT 500</td>
<td>Survey of Instructional Design</td>
<td>3</td>
</tr>
<tr>
<td>IDT 520</td>
<td>Instructional Systems Analysis and Design</td>
<td>3</td>
</tr>
<tr>
<td>IDT 525</td>
<td>Development, Implementation, and Evaluation of Instructional Materials</td>
<td>3</td>
</tr>
</tbody>
</table>
Area of Emphasis
Select three of the following: 9

IDT 550 Theories and Models of Instructional Design
IDT 590 Special Topics in Instructional Design and Technology
IDT 591 Readings in Instructional Design and Technology
IDT 592 Research in Instructional Design and Technology (MS must take scholarly tool, does not count toward cognate)
IDT 593 Directed Studies in Instructional Design and Technology

K-12 Emphasis
IDT 510 Technology-Based Instruction: Applications and Methods
IDT 540 Digital Media and the Internet in Schools

Corporate Emphasis
IDT 560 Instructional Design Consulting
IDT 570 Human Performance Technology

Computer- and Web-Based Instruction
IDT 530 Introduction to Computer-Based Instruction
IDT 555 Advanced Computer-Based Instructional Development
IDT 545 Instructional Simulations and Games
IDT 580 Introduction to Web-Based Instruction

Foundations
Any EFR Foundations course 3

Scholarly Tools
EFR 509 Introduction to Applied Educational Research 3
IDT 592 Research in Instructional Design and Technology 1-3

Internship
IDT 584 Internship in Instructional Design and Technology 2-4

Thesis/Scholarly Project
Select one of the following: 2-4
IDT 997 Independent Study
IDT 995 Scholarly Project
IDT 998 Thesis

Total Credits 29-35

Reading Education

M.S. in Reading Education (p. 422)
M.Ed. in Reading Education (p. 422)

Accelerated B.S. in Elementary Education with an M.S. in Reading Education (http://und-public.courselife.com/graduateacademicinformation/departmental/coursesprograms/education/readingeducation/accel)

Courses

T&L 511. Assessment in ECE. 3 Credits.
This course examines the construct and practice of assessment for teaching in birth to third-grade learning environments. The course considers the critical issues related to assessment and accountability in schools, focusing on why assessment is necessary, who the various assessment audiences are, what kind of assessment information is useful for each, and the time frame appropriate for such assessment information. Students study a variety of assessment methods currently used to evaluate teaching and learning in classrooms. They also discuss ways to communicate formative information about student progress to families, collaborate with colleagues to use assessment results to modify grade-level curricula for children with diverse abilities, and advocate for culturally, linguistically, and developmentally-appropriate forms of assessment. SS.

T&L 512. Mathematics in the Elementary School. 3 Credits.
A study of current trends and practices associated with teaching and assessing inquiry-based math in elementary classrooms.

T&L 513. Linguistics for ELL Teachers. 3 Credits.
This course introduces the complexities of human language through the study of phonetics, phonology, morphology, syntax and semantics. Additional topics addressed include the brain and language, history of the English language, psycholinguistics, writing systems and language in social contexts. SS.

T&L 514. Introduction to Multilingual Education. 3 Credits.
This course explores language education models, programs and policies with an emphasis on English language learners (ELLs). Political, legal, historical, and cultural contexts of multilingual education will be discussed with a focus on both U.S. and global challenges.

T&L 515. Middle School Curriculum. 3 Credits.
This course examines the middle school curriculum and instructional strategies as well as the needs of early adolescents. The course focuses on the roles teachers play in incorporating a guided, interdisciplinary, collaborative team approach. The studies include the components of curriculum learning, advisory, exploration, learning communities and instruction (differentiation, cooperative learning, learning styles, instructional strategies) incorporated in middle schools.

T&L 516. Philosophy and Foundations of Middle School Education. 3 Credits.
This course examines the historical and philosophical background of middle level education. The focus is on the roles teachers/administrators play in incorporating this guided, interdisciplinary, collaborative team approach that assists students during these fundamentally transformative years. The course looks at the philosophical aspect of the curriculum and instructional component. The studies explore contemporary issues associated with the middle school as well as the adaptations necessary for special circumstances affiliated with middle schools.

T&L 517. Social Emotional Learning & Guidance. 3 Credits.
This course is designed to offer strategies for caregivers to support young children’s positive social and emotional development, behavior, and learning through the exploration of how early experiences shape development. The emotional and social development of children, including the causes, expressions, prevention and management of challenging behaviors in all children birth to age eight are examined. Emphasis is placed on caregiver/family/child relationships, positive emotional/social environments, developmental implications, adverse childhood risk factors, and intervention strategies. Students will identify factors influencing emotional/social development, utilize screening measures, and design positive behavioral supports. SS.

T&L 518. Science in the Elementary School. 3 Credits.
A study of current trends and practices associated with teaching and assessing inquiry-based science in elementary classrooms.

T&L 519. Social Studies in the Elementary School. 3 Credits.
A study of current trends and practices associated with teaching and assessing social studies in elementary classrooms.

T&L 520. Curriculum and Instruction in the Elementary School. 4 Credits.
A study of processes for planning, implementing, and evaluating curriculum and improving instruction in elementary schools.

T&L 521. Differentiated Instruction. 3 Credits.
An introduction to the principles of differentiated instruction. Topics of study include: brain-based learning, responsive instructional and assessment strategies, linking curriculum standards to learner needs, organizing and managing a differentiated classroom, and relevant resources for implementation.

T&L 522. Mathematics in the Elementary School. 3 Credits.
A study of current trends and practices associated with teaching and assessing inquiry-based math in elementary classrooms.

T&L 523. Literacy Instruction for English Language Learners. 3 Credits.
This course addresses the foundations of teaching English language and literacy to English Language Learners (ELLs). Topics will include practices for reading and writing instruction, vocabulary development, assessment of reading and writing, choosing literature for ELLs, and the incorporation of media and technology in ELL literacy instruction. SS.

T&L 524. Reading in the Content Areas. 2 Credits.
How and why reading should be taught in the content areas (i.e. Social Studies, Science, Mathematics, etc.). Research studies in the field of content reading and a variety of instructional practices are reviewed.

T&L 525. Writing in the Classroom. 3 Credits.
This course examines writing as a process that is developmental, cultural, social, and individual. Emphasis is on effective implementation of the essential structures of writing workshop and on monitoring and assessing writers’ growth.
T&L 526. Play in Development and Early Childhood Education. 3 Credits.
This course explores the role of play in cognitive, physical, and social-emotional development, and the way in which play is incorporated into educational and other programmatic settings. Students will explore how assessment of play indicates a child's development, and they will use assessment to promote Developmentally Appropriate Practices (DAP) for PreK-Grade 3 (ages 3-8) learners.

T&L 527. Curricular Foundations in Early Childhood Education. 3 Credits.
This course examines the historical, philosophical, cultural, race, class, and gender influences on curriculum in early childhood, including the philosophy and mission of the Department of Teaching and Learning.

T&L 528. Children's and Young Adult Literature in the Classroom. 3 Credits.
This course explores the major area of literature for children and young adults in response to two questions: What is the range of literature available for children and young adults today? In what ways might children's and young adult literature be used in the classroom to promote literacy growth? SS.

T&L 529. Language Development & Cognition in Children. 3 Credits.
This course provides foundational information about language and cognitive development in children. The course content will also analyze typical and atypical language and cognitive development. The focus of the course will include children birth to age eight.

T&L 530. Foundations of Reading Instruction. 3-4 Credits.
This course focuses on the relationship between reading theory, research, contemporary issues and instructional practice. Emphasis is placed on strategic systems related to effective reading, instructional approaches that support the development of these strategic systems and assessment as collecting evidence of effective reading behaviors.

T&L 531. Early Literacy Development and Instruction. 3 Credits.
A study of early literacy processes including phonemic and print awareness, word recognition, comprehension, and writing. Emphasis is on reviewing current research and theory, assessment and instruction practices, and bridging language and literacy development in literacy rich environments.

T&L 532. Leadership in Literacy. 3 Credits.
The role of the literacy coach is to support teachers in closing the gap between learners' performance and achievement in reading and writing. Topics in this course will include providing leadership for a school's literacy program, collaboration with teachers and administrators, curriculum issues, knowledge of literacy standards, and professional development facilitation. On demand.

T&L 533. Secondary English Language Arts & Literacy Instruction. 3 Credits.
This graduate level course explores teaching literacy in the English Language Arts middle and high school classroom. Students will explore how the traditional and contemporary approaches to teaching literature, nonfiction, and digital media work to support the advanced literacy goals of reading, writing, listening, and speaking for adolescents. Students will explore Language Arts instructional methods and develop curriculum in the areas of literature, writer's workshop, academic inquiry, language vocabulary, and digital literacy. Students will also explore the ways the literacy program is supported and assessed throughout the entire secondary school. SS.

T&L 534. Basic Reading Diagnosis and Remediation. 2 Credits.
Focuses on common causes of reading disability, methods of diagnosis, and corrective reading programs in the classroom. Corequisites: T&L 583.

T&L 535. Advanced Reading/Language Arts Diagnosis and Remediation. 2 Credits.
Analysis of interrelationships of learning difficulties in language arts areas and procedures for remediation. Prerequisites: T&L 530 and T&L 534.

T&L 536. Innovations in English Language Arts Instruction. 3 Credits.
This course considers the current curricular trends and research-based best practices in teaching English Language Arts. Students will critically examine and apply current instructional approaches in teaching English language and vocabulary, classroom discourse practices, and digital literacies. We will consider the ways various instructional methods support the advancement of literacy development for all students, considering ways to modify and adapt curriculum to meet the cultural and linguistic diversity of today's classrooms. On demand.

T&L 537. ELL Methods and Materials. 3 Credits.
This course explores current methods and materials in ELL education, with a focus on teaching academic language and sheltered content instruction. F,S,SS.
T&L 553. Collaborative Relationships: Home, School and Community. 3 Credits.
A course appropriate for anyone working with families, early childhood educators, general educators, special educators, related service personnel, administrators and outside agency personnel. Topics covered include: (1) the various models of collaboration and consultation and the stages of each; (2) communication skills; (3) problem-solving; (4) conflict management; (5) diverse perspectives; (6) information collection procedures; (7) supervisory skills; (8) family characteristics and structure across the lifespan; (9) family focused intervention; (10) school choices; and (11) school issues such as poverty, domestic violence, teasing, bullying, and school violence.

T&L 558. Middle School Science and Engineering Lab1:Solids. 2 Credits.

T&L 559A. MS Sci.Eng-2: Solids. 3 Credits.
Prerequisites: T&L 558, admission to Graduate School, ND Teacher licensure and Admission to program "Improving Math and Science Literacy of Middle and High School Students of North Dakota Through Teacher-Faculty Partnerships".

T&L 559B. MS Sci.Eng-2: Solids. 3 Credits.
Prerequisites: T&L 558, admission to Graduate School, ND Teacher licensure and Admission to program "Improving Math and Science Literacy of Middle and High School Students of North Dakota Through Teacher-Faculty Partnerships".

T&L 566. Brain in Memory and Learning. 3 Credits.
Prerequisite: Admissions to Grad School.

T&L 567. Language Structure and Analysis for ELL Teachers. 3 Credits.
This course explores the grammatical and discourse structures of the modern English language, analysis of grammar and discourse with a focus on specific problem areas for ELLs, and pedagogical implications for English language development.

T&L 568. Research and Advocacy in TESOL. 3 Credits.
This course prepares teachers to both understand and conduct research in TESOL. Emphasis will be placed on using research data to advocate for changes and improvement in ELL education.

T&L 569. Action Research. 3 Credits.
The study of the philosophy and methods of action research. Emphasis is focused on analysis of and reflection on one's teaching for the purpose of improvements in student learning. Prerequisite: Graduate status. S.

T&L 571. Teacher Education. 3 Credits.
Practices, issues, and trends in the design and implementation and assessment of programs for the preparation and development of K-12 teachers.

T&L 572. Teacher Education: Focus on the Learner. 3 Credits.
The study of teacher education in relation to the lives of P-12 students. This course includes the examination of children and their lives through aspects of race, religion, socioeconomic, linguistic and age, and considers educational implications for preservice and inservice teachers.

T&L 573. Middle School Science and Engineering Lab2:Liq/Gas. 2 Credits.

T&L 574. MS Sci.Eng-4: Liquid/Gas. 3 Credits.
Prerequisites: T&L 573, admission to Graduate School, ND Teacher licensure and Admission to program "Improving Math and Science Literacy of Middle and High School Students of North Dakota Through Teacher-Faculty Partnerships".

T&L 575. Middle School Science and Engineering Lab3:Mot/Elec. 2 Credits.

T&L 576A. MS Sci.Eng-6:Motion/Electric. 3 Credits.
Prerequisites: T&L 575, admission to Graduate School, ND Teacher Licensure and employment as a teacher in a ND school.

T&L 576B. MS Sci.Eng-6:Motion/Electric. 3 Credits.
Prerequisite: T&L 576A.

T&L 577. Assessment of Learning. 3 Credits.
This course addresses the theory and practice of assessment, specifically the process of gathering and discussing information from multiple and diverse sources in order to develop a deep understanding of what students know, understand, and can do with their knowledge as a result of educational experiences.

T&L 579. Classroom Based Inquiry. 3 Credits.
Concepts learned in T&L 569 will be looked at in-depth and theoretical constructs such as Living Theory, Self Study, and Critical Theory constructs will be studied. Students plan and conduct an in-depth inquiry project within a school setting, complete the associated IRB, and create and academic and/or prepare a proposal of the Inquiry project for a professional setting. Prerequisites: TL graduate status and T&L 569; or by permission of instructor. F,S.

T&L 580. Practicum in Schools. 1-4 Credits.
Practicum in study of desirable school practices, observations in nearby schools, and application of research findings in solving practical problems. Prerequisites: Appropriate foundational and major area courses, and consent of the instructor and advisor. Repeatable.

T&L 581. Resident Internship. 4 Credits.
A full-time, year-long internship experience conducted in a cooperating school district. Interns are assigned as members of instructional teams with full responsibility for a portion of the cooperating school's instructional program. Prerequisites: Participation in the summer program prior to the internship and teaching licensure (see dept for approval).

T&L 582. Resident Internship. 4 Credits.
A full-time, year-long internship experience conducted in a cooperating school district. Interns are assigned as members of instructional teams with full responsibility for a portion of the cooperating school's instructional program. Prerequisites: Participation in the summer program prior to the internship and teaching licensure (see dept for approval).

T&L 583. Reading Clinic. 2 Credits.

T&L 584. Internship in Education. 1-8 Credits.
This is a culminating experience primarily for Sixth year and Doctoral students. The internships will be identified in one of the following sub-areas: (A) Educational Administration, (B) Special Education, (C) Curriculum, (D) Educational Research, or (E) Teacher Education. Prerequisites: Appropriate foundational, cognate, and major area coursework and consent of advisor and instructor. Repeatable.

T&L 589. Professional Development: Resident Teacher Program. 2 Credits.
This field-based experience provides mentoring and coaching, translates baccalaureate theory and research into practice, and requires active participation in the school placement and classroom setting. Issues and topics relevant to first year teachers and graduate education are emphasized through field work and discussions. Prerequisite: Admission into the Elementary Education Resident Teacher Program. SS.

T&L 590. Special Topics. 1-4 Credits.
Exploration of special topics in the study of education not regularly included in available course offerings. May be repeated for different topics. Prerequisite: Consent of instructor or advisor. Repeatable.

T&L 591. Readings in Education. 1-4 Credits.
Designed primarily for advanced graduate students. May be repeated for different topics. Prerequisite: Consent of instructor or advisor. Repeatable.

T&L 593. Independent Projects. 1-4 Credits.
Repeatable.

T&L 596. Individual Research in Education. 1-4 Credits.
Prerequisite: Consent of instructor and advisor. Repeatable.

T&L 995. Scholarly Project. 2 Credits.
The scholarly project demonstrates critical analysis and application of information and experiences gained throughout the program of study. The project allows students to demonstrate scholarly skills in an integrated manner that is directly related to their roles as teachers, program evaluators, and action researchers. The scholarly project must be approved by the student's advisor.

T&L 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

T&L 997. Independent Study. 2 Credits.

T&L 998. Thesis. 1-9 Credits.
Repeatable to 9 credits.

T&L 999. Dissertation. 1-15 Credits.
Repeatable to 15 credits.
Undergraduate Courses for Graduate Credit
T&L 322. Administration and Leadership in Early Childhood Education. 3 Credits.
An investigation of patterns of administration, curriculum organization, spatial resources, and staffing in early childhood settings, serving children 0-8 years old. Topics include federal and state laws and emerging trends in preschool and primary education in the state, region, and nation. Sixteen (16) hours of field experience. Prerequisite: Admission to the Teacher Education program. S.
T&L 422. Development of the Gifted and Talented. 2 Credits.
Research and theory for understanding the development needs of the more able child in early childhood and in educational experiences. S.
T&L 423. Assessment and Individualized Planning in Special Education. 3 Credits.
A study of the principles and practices of: (1) obtaining diagnostic information on school-related problems of a student; (2) assimilating this information and prescribing appropriate alterations based on continuous measurement data. Prerequisites or Corequisites: TL 315 and T&L 319. F,S.
T&L 493. Workshop. 1-4 Credits.
Special problems in Special Education; consideration of special problems of concern to the Special Education teacher and other educators. Repeatable to 8 credits. F,S.

Master of Education in Reading Education
Admission Requirements
For the M.Ed., teacher licensure at one of the following levels: early childhood, elementary, middle or secondary education, or a baccalaureate degree in another field of study is required.

The Reading Education program follows the School of Graduate Studies requirements for a cumulative undergraduate minimum grade point average of 2.75 or a junior/senior year minimum grade point average of 3.00. Applicants must satisfy the School of Graduate Studies’ English Language Proficiency requirements as listed in the Graduate Academic Information section of the graduate catalog. Transcripts, recommendations, and a personal statement, i.e., a response to three essay prompts, are part of the School of Graduate Studies Admissions and the Education Application Procedure. The personal statement essay should be three pages in length and the prompts are:

1. Describe your professional background, especially as it relates to teaching reading, writing and other areas of reading/language arts.
2. What characteristics and strengths do you possess that make you a good candidate for this degree program?
3. Discuss your professional goals.

Refer to the School of Graduate Studies Admissions and the Education Admissions Process sections of the graduate catalog for additional information on degree and application requirements and procedures.

Degree Requirements
The M.Ed. degree requirements are based on the following components:

1. Core Requirements for the Reading Education major and literacy education electives: The courses in the major engage students in learning content about diverse readers, writers, and speakers; curriculum, methods of teaching and assessing; literacy theory and foundations; and professional perspective. T&L 583 Reading Clinic, one of the Core Requirements, involves students in a practicum experience in which they work with readers to apply their core knowledge about teaching literacy to diverse readers.
2. Cognate: Cognate courses are a selection of courses providing broad support to the major.

The M.Ed. Reading Education degree program requires coursework in three areas: The major (reading education), cognate, i.e., coursework that supplements the major, and foundations of education. The program culminates in T&L 995 Scholarly Project or T&L 997 Independent Study. With careful planning, most students can meet the course requirements for the North Dakota Reading Credential.

The credit hours for the M.Ed., Reading Education consist of:

T&L 524 Reading in the Content Areas 2
T&L 525 Writing in the Classroom 3
T&L 530 Foundations of Reading Instruction 3
T&L 534 Basic Reading Diagnosis and Remediation 2
T&L 536 Innovations in English Language Arts Instruction 3
T&L 583 Reading Clinic (corequisite with T&L 534) 2

Select one of the following:

T&L 528 Children’s and Young Adult Literature in the Classroom 3
T&L 531 Early Literacy Development and Instruction
T&L 532 Leadership in Literacy
T&L 533 Secondary English Language Arts & Literacy Instruction
T&L 995 Scholarly Project 2
or T&L 997 Independent Study

Cognate
Sample choices: 6
T&L 569 Action Research
SPED 552 Inclusive Methods
T&L 540 Theory and Philosophies of Curriculum in Schools
T&L 577 Assessment of Learning
T&L 518 Science in the Elementary School
T&L 519 Social Studies in the Elementary School
T&L 522 Mathematics in the Elementary School
T&L 526 Play in Development and Early Childhood Education
T&L 529 Language Development & Cognition in Children
T&L 553 Collaborative Relationships: Home, School and Community

Other courses are suited to the cognate to this area, e.g., English Language Learner courses; courses outside of the department and college may also be acceptable; consult with your advisor.

Educational Foundations
EFR 500 Introduction to the Foundations of Education 3

Select one of the following: 3
EFR 506 Multicultural Education
EFR 501 Psychological Foundations of Education
EFR 502 Issues and Trends in Education
EFR 503 Historical Foundations of Education
EFR 504 Philosophical Foundations of Education
EFR 505 Sociological Foundations of Education
EFR 507 Gender, Sexuality and Education
EFR 508 Anthropological Foundations of Education

Total Credits 32

Master of Science in Reading Education
Admission Requirements
For the M.S., teacher licensure at one of the following levels: early childhood, elementary, middle or secondary education.

The Reading Education program follows the School of Graduate Studies requirements for a cumulative undergraduate minimum grade point average of 2.75 or a junior/senior year minimum grade point average of 3.00. Applicants must satisfy the School of Graduate Studies’ English Language Proficiency requirements as listed in the Graduate Academic Information section of the graduate catalog. Transcripts, recommendations, and a personal statement, i.e., a response to three essay prompts, are part of the School of Graduate
Special Education

M.S. in Special Education (p. 429)

M.Ed. in Special Education (p. 426)

Accelerated B.S.Ed. in Early Childhood Education with Minor in Special Education/M.Ed. in Special Education with Specialization in Early Childhood Special Education (http://und-public.courseleaf.com/graduateacademicinformation/departmentalcoursesprograms/education/specialeducation/accel2)


Courses

SPED 500. Introduction to Visual Impairment. 3 Credits.
A course which provides an overview of the field of visual impairment to include the following areas of emphases: History/Philosophy; Service-delivery models; medical, psychological and educational implications of partial vision or total blindness; curricula methods and materials; current issues/trends. F.

SPED 501. Diseases and Function of the Eye. 2 Credits.
A course which introduces students to: a) the structural parts of the eye and its functions; b) common ocular conditions and diseases and their implications for education; c) interpretation of medical eye examination reports; and d) special considerations for infants, school-age academic, multiply disabled and adult populations.

SPED 502. Braille Reading and Writing. 2 Credits.
In this course students learn: 1) to read and write the literary code of grade 2 braille and 2) to teach the literary code of grade 2 braille to students of all ages.

SPED 503. Orientation and Mobility/Visual Impairment. 2 Credits.
This course introduces students to basic orientation and mobility techniques used by specialists when working with individuals with low vision and blindness. Concept development, kinesiology, tactile map construction, dog guides, electronic mobility devices and parental involvement are topics covered with respect to various populations (i.e., infants, school-age children, and adults). S.

SPED 504. Communication Media and Methods/Visual Impairment. 3 Credits.
This course provides an overview of the communication devices and adaptive technology used by individuals with low vision and blindness. Students learn to read and write the braille codes for mathematics and music, do basic calculations on the abacus, brailer and talking calculator and gain familiarity with computers and software currently used in the field. Prerequisite: Consent of instructor. F.

SPED 505. Low Vision Assessment and Remediation. 3 Credits.
A course which focuses on children who have severe visual deficits but with proper training are able to utilize their vision for learning. Effects of low vision are studied with respect to psychological/sociological development, academic learning, skills of independent living, and vocational choice. Methods of assessing visual function are examined with emphasis on adaptations needed in the educational settings. Optical and non-optical aids are compared and evaluated. F.

SPED 506. Introduction to Emotional Behavioral Disorders. 3 Credits.
The historical perspective and the complexities of identification and characteristics of emotional disorders will be covered. Students will gain an understanding of service delivery models within a multisystems approach. F,S,SS.

SPED 507. Introduction to Intellectual Disabilities. 3 Credits.
The historical perspectives and the complexities of identification and characteristics of developmental/cognitive disabilities will be covered. Students will gain an understanding of service delivery models within a multi-systems approach. F,S,SS.

SPED 508. Introduction to Learning Disabilities. 3 Credits.
The historical perspective and the complexities of identification and characteristics of learning disabilities will be covered. Students will gain an understanding of service delivery models within a multisystems approach. F,S,SS.

SPED 509. IEP Development. 2 Credits.
This course is an introduction to the individualized education plan (IEP) process, including an understanding of how to develop and write effective IEPs for students with disabilities. In addition, the IEP template and process used by the state of North Dakota (i.e., TIENET) will be addressed.

SPED 510. Introduction to Early Childhood Special Education. 3 Credits.
An introduction to the field of Early Childhood Special Education, primarily for students interested in entering the field. Issues such as program design, parent involvement, identification, infant education, and effects of disabilities will be covered. F,S,SS.
SPED 511. Identification and Assessment of Young Children with Special Needs. 3 Credits.
A study of the principles and procedures for screening, identifying and evaluating young children with special needs. Emphasis will be placed on exposing students to available assessment instruments and providing opportunities for actual testing of preschoolers. Prerequisite: Admission to one of the master's programs in special education.

SPED 512. Methods and Materials for Preschool Children with Special Needs. 3 Credits.
A comprehensive study of curricula, program development and intervention strategies for disabled children ages birth to 6. Prerequisite: Admission to one of the master's programs in special education.

SPED 514. Intervention Strategies with Infants and Toddlers. 3 Credits.
This course provides for study into the unique needs of infants and toddlers with disabilities as well as the delivery of intervention services to the very young child with disabilities and his/her family. SS.

SPED 515. Professional Development. 1 Credit.
This course will provide an orientation to the roles and responsibilities of being a resident teacher in special education. Restricted to resident teachers in special education.

SPED 516. Collaborative Authentic Assessment in Early Intervention. 3 Credits.
This course is designed to evaluate the historical perspectives and philosophical basis of early intervention; rationale for early intervention; link between assessment, intervention, and evaluation; early interactions between the developing child and the environment; normal developmental sequences and atypical development. Specific emphasis will be placed on the role of authentic assessment within the paradigm of supporting infants, toddlers and their families through everyday activities. S.

SPED 521. Transition to Adult Life. 3 Credits.
This course focuses on education, personal and vocational transition issues for students with disabilities across all grade levels into adult life. Assessment and transition planning will be covered along with interagency collaboration skills and career awareness.

SPED 522. Introduction to Gifted/Talented Education. 3 Credits.
Historical and evolutionary research, theories, and philosophies for understanding the developmental and social-emotional needs of the more able child from early childhood through adolescence in educational experiences. Characteristics of G/T learners in the intellectual, leadership, academic, and creative realms; asynchrony; stereotypes; comorbidities; issues surrounding the identification of G/T learners. Cultural and societal influences on the field; educational trends. Prerequisite: TL 315 or permission of the instructor.

SPED 523. Assessment in Gifted/Talented Education. 3 Credits.
Formal and informal assessments of characteristics of G/T learners in the intellectual, leadership, academic, and creative realms for identification and qualification for educational programming; assessment of readiness and content mastery. Ongoing assessment, progress monitoring, and data interpretation skills will be practiced. Issues surrounding the identification of G/T learners, including misdiagnosis, stereotyping, and bias will be critically evaluated. Legal issues surrounding this area, and cultural influences on data sources will be explored. Prerequisite: TL 315, and T&L 423 or SPED 551, or permission of the instructor.

SPED 524. Teaching Methods in Gifted/Talented Education. 3 Credits.
Methodological and pedagogical approaches for fulfilling the unique academic, intellectual, creative, social, and emotional needs of the more able child in the educational environment. Exploration and analysis of contributing research, theories, and philosophies for designing differentiated learning opportunities from early childhood through adolescence via multiple modes (i.e. Bloom's Taxonomy, Multiple Intelligences, technologies, multicultural and creative materials, etc.); educational trends through curriculum design and the integration of formal and informal assessment data and national/ state standards to create individualized learning goals through curriculum compacting, tiering, acceleration, academic planning, modifications, and mentorships. Exploration and analysis of curriculum models to suit various learning needs of the asynchronous child with multiple forms of exceptionality (LD, ED, ASD, ELL); legal, cultural, and stereotype issues affecting the implementation of enriched curriculum for the G/T child with comorbidities. Prerequisite: SPED 522.

SPED 525. Legal/Ethical Aspects in Special Education. 3 Credits.
This course covers the theory and study of special education law for children with disabilities. F.S.SS.

SPED 528. Advanced Assistive Technology. 1 Credit.
This course covers the types and functions of assistive technology for students with disabilities across a variety of settings, e.g., home, schools and community. Assistive technology assessment and a working knowledge of best practices of assistive technology in the lives of students will be addressed. Identification of funding sources and assistive technology resources will also be covered.

SPED 530. Braille Code 1. 2 Credits.
Students will complete seven initial self-paced learning units (chapters) consisting of lessons that will lead them to being a proficient Braille reader and writer. F.

SPED 531. Braille Code 2. 2 Credits.
Students will complete four final self-paced learning units (chapters) consisting of lessons that will lead them to being a proficient Braille reader and writer. Prerequisite or Corequisite: SPED 530. S.

SPED 532. Visual Impairment/Early Intervention. 3 Credits.
This course covers the purpose and principles of early intervention. It addresses the developmental needs of young children with visual impairments and effective strategies to meet those needs. It also covers the role of teachers of students with visual impairment in the early intervention program as well as key aspects of consultation, interdisciplinary collaboration, service coordination, and culturally sensitive family-centered services. S.

SPED 540. Concepts and Principles in Behavior Analysis. 3 Credits.
This course introduces definitions, characteristics, principles, processes and concepts of Applied Behavior Analysis. In addition, the philosophical assumptions and dimensions of the science of applied behavior analysis, including determinism, empiricism, parsimony, selectionism, pragmatism, and lawfulness of behavior will be addressed. Students will learn to differentiate between environmental and mentalistic explanations of behavior, and between conceptual, experimental, and applied analyses of behavior. F.S.SS.

SPED 541. Methods and Applications in Behavior Analysis. 3 Credits.
This course addresses behaviorally-based strategies to establish, strengthen, and weaken target behaviors. Fundamental elements of behavior change are reviewed, with a focus on selecting evidence-based tactics that utilize basic principles of behavior (reinforcement, punishment, extinction, and stimulus control), as well as utilizing appropriate parameters and schedules of reinforcement and punishment. Various procedures combining fundamental behavior principles are reviewed, modeled, practiced, and demonstrated to mastery and fluency. F.S.SS.

SPED 542. Ethical and Professional Conduct for Behavior Analysts. 3 Credits.
This course introduces ethical and professional considerations relevant in the professional practice of applied behavior analysis as well as the ethical and disciplinary standards of the profession. Students will become familiar with the ethical and professional conduct and legal issues relevant to Board Certified Behavior Analyst-level practitioners found in the Behavior Analyst Certification Board's Guidelines for Responsible Conduct for Behavior Analysts and Disciplinary and Ethical Standards and Disciplinary Procedures (2012), as well as the professional conduct consistent with the practice of applied behavior analysis. F.S.SS.

SPED 543. Applied Behavior Analysis Supervision Across Settings and Populations. 3 Credits.
This course will focus on client-centered responsibilities across settings, including identification of the problem and selection and implementation of interventions based on biological, medical, and environmental variables. The course will also address management of behavioral services and supervision of those responsible for carrying out behavior change procedures. F.S.SS.

SPED 544. Research Methods in Behavior Analysis. 3 Credits.
This course focuses on the measurement of behavior and the analysis of intervention effect using single-subject experimental design. Procedures for collection and display of behavioral data are demonstrated, practiced, and examined for reliability, validity, efficiency, and relevance to a variety of settings, with a focus on educational environments. Individualized measurement procedures are developed and implemented using a variety of single-subject design formats, and the contribution of single-subject research design to education, clinical practice, and scientific inquiry is examined. Ethical considerations of experimental analysis are examined. F.S.SS.
SPED 545. Assessment and Behavior Change Systems. 4 Credits.
This course will address the process of identifying behaviors targeted for change and the use of behavioral assessment techniques to identify and analyze behavior-environment relations for the purpose of developing successful, functionally-based intervention strategies. Students will learn a variety of methods for behavior assessment, interventions, analysis of interventions, experimental analysis, and interpreting outcomes including the use of practical behavior-based assessment tools such as checklists, rating scales, structured observation tools, and curricular assessments. F, S, SS.

SPED 546. Philosophical Underpinnings of Applied Behavior Analysis. 3 Credits.
This course will focus on the philosophical underpinnings of behavior analysis. Radical behaviorism will be discussed in depth as it relates to many topics including verbal behavior, creativity, reasoning, and thinking. F, S, SS.

SPED 551. Advanced Assessment in Special Education. 3 Credits.
Theory and practice of assessment, including formal and informal procedures for screening, identification and assessment of students with disabilities. Practical assignment included. Prerequisite: Admission to one of the master's programs in special education. F, S, SS.

SPED 552. Inclusive Methods. 3 Credits.
The study of a variety of methods and materials for teaching and assessing children and youth with learning and behavior problems in the general education classroom. F, S, SS.

SPED 554. Advanced Methods: Learning Disabilities. 3 Credits.
The study of specific strategies, methods, and materials for working with students with learning disabilities. Prerequisite: Admission to one of the master's programs in special education. F, S, SS.

SPED 555. Advanced Methods: Emotional Behavioral Disorders. 3 Credits.
The study of specific strategies, methods, and materials for working with students with emotional/behavioral disorders. Prerequisite: Admission to one of the master's programs in special education. F, S, SS.

SPED 556. Advanced Methods: Intellectual Disabilities. 3 Credits.
This course is a masters level methods course designed for professionals seeking to extend their skills in the areas of instruction, functional (life skills) curriculum, program and curriculum development, and functional behavioral analysis for working with students with moderate to severe intellectual disabilities. Prerequisites: Graduate status and admission to one of the master's programs in special education. F, S, SS.

SPED 557. Progress Monitoring. 3 Credits.
This course covers all aspects of progress monitoring including what it is, how it works, the benefits of progress monitoring, various ways and strategies for conducting progress monitoring and how it functions in a Response to Intervention (RTI) model. Students will learn how to track students in reading, math, and written language by collecting data and then using that data to measure student progress and in instructional decision-making. The strongest research-based strategy for progress monitoring, curriculum-based measurement, will be covered in depth. Prerequisite: Admission to one of the master's programs in special education. F, S, SS.

SPED 558. Response to Intervention. 2 Credits.
This course will address common elements of Response to Intervention (RTI) including definition, components of successful RTI models, establishing RTI teams and building capacity for school-wide RTI implementation, the use of standard protocol in RTI implementation, monitoring progress in academics and behavior within RTI models, understanding guidelines for problem-solving/decision making in RTI, as well as the future direction of RTI. F, S, SS.

SPED 560. Introduction to Autism Spectrum Disorder. 3 Credits.
This is the introductory course in a sequence of interdisciplinary courses focusing on autism spectrum disorder. Its central purpose is to encourage parents and caregivers of individuals with autism spectrum disorder to engage in reflective thinking about and critical analysis of the many and varied issues, e.g., identification, educational placement, effective treatments, vocational training, related to the provision of quality lifelong supports for these individuals. Prerequisites: Completed degree from a related field of study, or seniors who have completed TL 315, and are completing an undergrad degree from a related field of study (see dept for approval). F, S, SS.

SPED 561. Methods for Autism Spectrum Disorder. 3 Credits.
This is a required course in a sequence of interdisciplinary courses focusing on autism spectrum disorder (ASD). Its central purpose is to address commonly implemented intervention strategies, particularly those considered to be evidence based or research supported in the field of ASD. This course examines the current literature base supporting various interventions and strategies with a focus on matching the needs and strengths of individuals with ASD to the most appropriate intervention method based on data driven practice and research support for a particular intervention. Prerequisite or corequisite: SPED 560. F, S, SS.

SPED 562. Autism Spectrum Disorder: Supports Across the Lifespan. 3 Credits.
This course is in a sequence of interdisciplinary courses focusing on autism spectrum disorder (ASD). Issues related to parental reactions to diagnosis, stressors at home and school, strategies for empowering families, transitional situations for individuals with ASD, transitions to jobs and college, and legal issues will be explored. The central purpose of the course is threefold: a) to provide current information related to the chronic stressors experienced by caregivers for and family members of persons with ASD, b) to provide current information regarding career/vocational options related to transition from high school through adult life, e.g., young adults, middle-aged adults, older adults, and c) to provide current information regarding legal issues related to the provision of lifelong supports for persons with ASD. Prerequisite: Completed degree from a related field of study. Prerequisites or corequisites: SPED 560 and SPED 561. F, S.

SPED 563. Autism Spectrum Disorder: Medical Issues and Trends. 3 Credits.
This course is in a sequence of interdisciplinary courses focusing on autism spectrum disorders (ASD). The purpose of this course is to examine the historical perspective and complexities of the role of medicine and medically oriented interventions for individuals with ASD. Issues will be explored related to conducting wellness examinations, current and future medication treatments, genetics, collaboration, and resources. Prerequisite: A completed degree from a related field of study. Prerequisites or corequisites: SPED 560 and SPED 561. F, S.

SPED 564. Structured Teaching. 3 Credits.
This is an elective course in the sequence of interdisciplinary courses focusing on autistic spectrum disorder (ASD). Its central purpose is to encourage parents and caregivers of individuals with ASD to engage in reflective thinking about and critical analysis of this educational approach for these persons. Prerequisites or corequisites: SPED 560 and SPED 561. F.

SPED 565. Methods for Students with Asperger Syndrome. 3 Credits.
This course is in a sequence of interdisciplinary courses focusing on autistic spectrum disorders (ASD), specifically focusing on those individuals with diagnoses or high functioning autism, Aspergers, and ASD with lower levels of support needed. The purpose of this course is to equip individuals interacting and working with people with high functioning ASD the pertinent background knowledge and experience with the diagnosis and characteristics to effectively implement assessments, functional analysis, various methods and practices, and transition planning to support individuals with ASD and their families. Prerequisite: A completed degree from a related field of study. Prerequisites or corequisites: SPED 560 and SPED 561. F.

SPED 566. Autism Spectrum Disorder: Intensive Early Intervention. 3 Credits.
This is an elective course in the sequence of interdisciplinary courses focusing on children with autistic spectrum disorder (ASD) birth to age six. Topics addressed will include basic characteristics of children with ASD birth to age six, the developmental implications for these children and their families, and research-supported early interventions utilizing a family-centered approach with an emphasis on natural learning opportunities. Prerequisite: A completed degree from a related field of study. F, S, SS.
SPED 567. ASD Assessment. 3 Credits.
This course is a required course in a sequence of interdisciplinary courses focusing on autistic spectrum disorders (ASD). This course will address the entire process of program planning for students with ASD including screening, evaluative assessment, ongoing assessment, using assessment to guide intervention planning, and monitoring progress. Students will explore a variety of methods and tools commonly used with individuals with ASD; specifically standardized assessments, checklists, rating scales, structured observation tools, and curricular based assessments. Its central focus is on assessing the ongoing needs and strengths of individuals with ASD in order to plan successful interventions in further differentiating instruction. Prerequisite: SPED 560. Corequisite: SPED 561. F,S,SS.

SPED 570. The Educational Diagnostician. 3 Credits.
This course studies the roles and responsibilities of an educational diagnostician in a school district and/or special education unit. Prerequisite: Admission to the Doctor of Education program or permission of instructor. On demand.

SPED 571. Social, Emotional, and Behavioral Assessment Measures in Special Education. 3 Credits.
This course is focused on social, emotional, and behavior assessment measures used in special education. Both informal and formal measures are embedded to obtain multiple perspectives for effective school programming. Assessment practices are situated within the federal special education law and culminate with a comprehensive assessment report. Prerequisite: Admission to the Doctor of Education program or permission of instructor. On demand.

SPED 572. Achievement Assessment Measures in Special Education. 3 Credits.
This course is focused on achievement assessment measures used in special education specific to reading, written language, and mathematics. Both formal and informal measures are embedded for individualized school programming based on federal special education law. Prerequisite: Admission to the Doctor of Education program or permission of instructor. On demand.

SPED 578. Behavior Management. 3 Credits.
The study of a variety of effective behavior management and assessment techniques appropriate to the needs of children and youth with special needs. Topics include procedures to increase self-awareness, self-management, self-control, self-reliance, self-esteem, and assessment procedures and techniques for determining behavioral needs. Prerequisite: Admission to one of the master's programs in special education. F,S,SS.

SPED 580. Practicum: Special Education. 1-6 Credits.
Practicum in the study of children and adolescents with disabilities in school and related settings. Repeatable to 15 credits. F,S,SS.

SPED 582. Internship: Educational Diagnostician. 1-4 Credits.
Professional practice as an educational diagnostician in an approved educational setting. Prerequisite: Admission to the Doctor of Education program or permission of instructor. Repeatable to 4 credits. On demand.

SPED 583. Internship: Autism Spectrum Disorder. 1-6 Credits.
This is a culminating experience for students in the area of autism spectrum disorders. This course is designed for students to synthesize previously learned information from coursework as they apply and implement their knowledge and skills through written products and classroom performance. Prerequisites: SPED 560, SPED 561, and consent of the instructor. Repeatable to 6 credits.

SPED 584. Internship: Gifted/Talented. 1-6 Credits.
This is a culminating experience for students in the area of gifted/talented. This course is designed for students to synthesize previously learned information from coursework as they apply and implement their knowledge and skills through written products and classroom performance. Prerequisites: SPED 522, SPED 523, and SPED 524, or consent of the instructor. Repeatable to 6 credits.

SPED 585. Internship: Visual Impairment. 1-6 Credits.
This is a culminating experience for students who are seeking licensure or an endorsement in the area of visual impairment. This course is designed for students to synthesize previously learned information from coursework as they apply and implement their knowledge and skills through written products and classroom performance. Repeatable up to 6 credits maximum. Prerequisites: SPED 500, SPED 501, SPED 502, and consent of the instructor. Repeatable to 6 credits. F,S,SS.

SPED 586. Internship: Emotional Behavioral Disorders. 1-6 Credits.
This is a culminating experience for students in the area of emotional disturbance. This course is designed for students to synthesize previously learned information from coursework as they apply and implement their knowledge and skills through written products and classroom performance. Prerequisite: Consent of instructor. Repeatable to 6 credits. F,S,SS.

SPED 587. Internship: Intellectual Disabilities. 1-6 Credits.
This is a culminating experience for students in the area of Intellectual disabilities. This course is designed for students to synthesize previously learned information from coursework as they apply and implement their knowledge and skills through written products and classroom performance. Prerequisite: Consent of instructor. Repeatable to 6 credits. F,S,SS.

SPED 588. Internship: Learning Disabilities. 1-6 Credits.
This is a culminating experience for students in the area of learning disabilities. This course is designed for students to synthesize previously learned information from coursework as they apply and implement their knowledge and skills through written products and classroom performance. Prerequisite: Consent of instructor. Repeatable to 6 credits.

SPED 590. Special Topics in Special Education. 1-4 Credits.
Exploration of special topics in the study of special education. May be repeated for different topics. Repeatable to 30 credits.

SPED 591. Readings: Special Education. 1-4 Credits.
Designed primarily for advanced graduate students. May be repeated for different topics. Repeatable. F,S,SS.

SPED 593. Independent Project: Special Education. 1-4 Credits.
Designed primarily for advanced graduate students. May be repeated for different topics. Prerequisites: Consent of advisor and Instructor. Repeatable.

SPED 997. Independent Study Report. 2 Credits.
Independent study and preparation of a written report for students taking the non-thesis option in the Master's program. F,S,SS.

Master of Education in Special Education

Admission Requirements for the M.Ed.
The Master of Education (M.Ed.) is designed for those who do not have a previous degree in education. This degree will have a pedagogy focus to build a foundation for the art and science of teaching.

1. A bachelor's degree.
2. For students seeking a North Dakota teaching endorsement, T&L 315 Education of Exceptional Students, or its equivalent taken as either a prerequisite or corequisite with the master's coursework.
3. For students seeking a North Dakota teacher endorsement, an elementary reading methods course and an elementary math methods course taken as either prerequisites or corequisites with the master's coursework.
4. A cumulative grade point average (GPA) of at least 3.0 for the junior and senior years of undergraduate work (based on A = 4.00).
5. Satisfy the School of Graduate Studies' English Language Proficiency requirements as published in the graduate catalog.
Admissions Process
1. Complete the School of Graduate Studies online application.
2. Submit the application fee of $35.
3. Recommend three people who will complete the recommendation form:
   a. one from an employment supervisor or administrator;
   b. one from a professional colleague or university professor; and
   c. one from a professional of your choosing.
4. Send official transcripts from each institution attended to the School of
   Graduate Studies.
5. Complete the personal statement and attach it in the “essay” section of
   the application. The personal statement should address four questions:
   a. Explain how your experiences/interests reflect your capacity for the
      specialization area you are apply for specifically (i.e., LD, EBD, ID, VI,
      ECSE, ASD, SES, G&T, General).
   b. Identify a behavioral or learning need with an individual whom you
      know professionally or personally, then describe how you approached
      managing it.
   c. Graduate school may be challenging due to competing demands for
      your time. Please address how you will navigate these challenges by
      utilizing your strengths.
   d. In this master’s program, you will receive constructive feedback to
      develop and/or enhance your skills. Explain how you have perceived
      and managed this type of feedback in your past experiences.

Descriptions of the Specialization Areas

Autism Spectrum Disorder (ASD): The ASD specialization area focuses on
children, adolescents, and adults with ASD and addresses several aspects
of ASD including characteristics, assessment, methods/strategies, interagency
collaboration/support, and application in a field setting.

Early Childhood Special Education (ECSE): The ECSE specialization area
focuses on children from birth to age nine and addresses various disabilities,
primarily developmental in nature, and addresses several aspects of ECSE
including characteristics, assessment, methods/strategies, all forms of
development, (e.g., language, physical), and application in a field setting.

Emotional Behavioral Disorders (EBD): The EBD specialization area focuses on
children and adolescents with both emotional and behavior disorders and
addresses several aspects of EBD including characteristics, assessment, behavior and academic methods/strategies, and application in a field setting.

General Special Education: The general specialization area is a “design your
own program” option. Students can choose courses from all of the courses
offered by the special education program.

Gifted/Talented Education (GT): The GT specialization area focuses on
children and youth with outstanding talent who perform or show the potential
for performing at remarkably high levels of accomplishment when compared
with others of their age, experience, or environment. The specialization area
addresses characteristics, assessment, methods/strategies, and application in
a field setting.

Intellectual Disabilities (ID): The ID specialization area focuses on children
and adolescents with DCD (the federal law refers to this population as those
with mental retardation) and addresses several aspects of ID including
characteristics, assessment, methods/strategies, and application in a field setting.

Learning Disabilities (LD): The LD specialization area focuses on children
and adolescents with learning problems that are not due to developmental,
emotional, or cognitive disabilities and addresses several aspects of LD
including characteristics, assessment, methods/strategies, and application in a field setting.

Special Education Strategist (SES): The SES specialization area is a cross-
categorical area that encompasses all of the courses in the specialization areas
of ID, ED, and LD. Since it addresses three disability areas, it is the largest
specialization area in number of credits required.

Visual Impairment (VI): The VI specialization area focuses on children and
adolescents who are visually impaired or blind and addresses several aspects
of VI including characteristics, assessment, braille code, methods/strategies,
orientation/mobility, and application in a field setting.

Degree Requirements
Students seeking the Master of Education degree at the University of North
Dakota must satisfy all general requirements set forth by the School of
Graduate Studies as well as particular requirements set forth by the Special
Education Program.

1. A minimum of 32 credits is required for the degree. Additional credits may
   be needed for teacher licensure.
2. At least one-half of the credits must be at or above the 500 level.
3. A maximum of one-fourth of the credit hours may be transferred from
   another institution.
4. Preparation of a written independent study or scholarly project approved
   by the faculty advisor: Two credits of SPED 995 Scholarly Project or four
   credits of T&L 998 Thesis.
5. Passing of a written final comprehensive examination.
6. Nine credits of Special Education Core Coursework (excluding students in
   the ABA specialization).
   a. SPED 525 Legal/Ethical Aspects in Special Education 3
   b. SPED 578 Behavior Management 3
   c. Select 1 of the Following:
      i. SPED 500 Introduction to Visual Impairment 3
      ii. SPED 510 Introduction to Early Childhood Special
         Education 3
      iii. SPED 552 Inclusive Methods 3
   d. Six credits of pedagogical coursework.
      i. T&L 590 Special Topics 1-4
      ii. T&L 521 Differentiated Instruction 3
      iii. T&L 542 Models of Teaching 3
6. In addition to #4 and #5 above, choose one or more specialization areas
   and complete the required courses and elective courses for a minimum
   total of 32 credits for the M.Ed. degree*:  

Autism Spectrum Disorder (ASD)

Required Courses
- SPED 560 Introduction to Autism Spectrum Disorder 3
- SPED 561 Methods for Autism Spectrum Disorder 3
- SPED 567 Assessment in Autism Spectrum Disorder 3
- SPED 583 Internship: Autism Spectrum Disorder 1-6

Elective Courses
- Select nine of the following: 18
  - SPED 540 Concepts and Principles in Behavior Analysis 3
  - SPED 544 Research Methods in Behavior Analysis 3
  - SPED 558 Multi-Tier System of Supports 3
  - SPED 562 Autism Spectrum Disorder: Supports Across the Lifespan 3
  - SPED 563 Autism Spectrum Disorder: Medical Issues and Trends 3
  - SPED 564 Structured Teaching 3
  - SPED 565 Methods for Students with Asperger Syndrome 3
  - SPED 566 Autism Spectrum Disorder: Intensive Early Intervention 3

Additional credits from the other specialization areas

Total Credits 28-33

Early Childhood Special Education (ECSE)

Required Courses
- SPED 510 Introduction to Early Childhood Special Education 3
- SPED 511 Identification and Assessment of Young Children with Special Needs 3
- SPED 512 Methods and Materials for Preschool Children with Special Needs 3
- SPED 589 Internship: Early Childhood Special Education 1-4
Elective Courses
Select six of the following: 15
- SPED 509 IEP Development
- SPED 514 Intervention Strategies with Infants and Toddlers
- SPED 516 Collaborative Authentic Assessment in Early Intervention
- SPED 528 Advanced Assistive Technology
- SPED 557 Progress Monitoring
- SPED 558 Multi-Tier System of Supports
- SPED 566 Autism Spectrum Disorder: Intensive Early Intervention
- SPED 590 Special Topics in Special Education (Infant/Toddler Mental Health)
- T&L 529 Language Development & Cognition in Children
- T&L 553 Collaborative Relationships: Home, School and Community

Total Credits 25-28

* If seeking special education endorsement in ECSE in North Dakota, confer with your advisor regarding these requirements. If seeking teacher certification in a state other than North Dakota, refer to that state’s requirements.

### Emotional Behavioral Disorders (EBD)

**Required Courses**
- SPED 506 Introduction to Emotional Behavioral Disorders 3
- SPED 551 Advanced Assessment in Special Education 3
- SPED 555 Advanced Methods: Emotional Behavioral Disorders 3
- SPED 509 IEP Development
- SPED 586 Internship: Emotional Behavioral Disorders 1-6

**Elective Courses**
Select five of the following: 15
- SPED 521 Transition to Adult Life
- SPED 528 Advanced Assistive Technology
- SPED 557 Progress Monitoring
- SPED 558 Multi-Tier System of Supports
- T&L 553 Collaborative Relationships: Home, School and Community

Additional credits from the other specialization areas

Total Credits 25-30

* If seeking special education endorsement in EBD in North Dakota, confer with your advisor regarding these requirements. If seeking teacher certification in a state other than North Dakota, refer to that state’s requirements.

### Gifted/Talented (GT)

**Required Courses**
- SPED 522 Introduction to Gifted/Talented Education 3
- SPED 523 Assessment in Gifted/Talented Education 3
- SPED 524 Teaching Methods in Gifted/Talented Education 3
- SPED 584 Internship: Gifted/Talented 1-6

**Elective Courses**
Select five of the following: 15
- SPED 551 Advanced Assessment in Special Education
- SPED 557 Progress Monitoring
- SPED 558 Multi-Tier System of Supports
- T&L 553 Collaborative Relationships: Home, School and Community

Additional credits from the other specialization areas or other T&L courses approved by the advisor

Total Credits 25-30

* If seeking special education endorsement in GT in North Dakota, confer with your advisor regarding these requirements. If seeking teacher certification in a state other than North Dakota, refer to that state’s requirements.

### General Special Education

Note that there are no additional required courses. A minimum of 25 credits can be selected from the following courses:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>SPED 500</td>
<td>Introduction to Visual Impairment</td>
<td>3</td>
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<tr>
<td>SPED 501</td>
<td>Diseases and Function of the Eye</td>
<td>2</td>
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<tr>
<td>SPED 503</td>
<td>Orientation and Mobility/Visual Impairment</td>
<td>2</td>
</tr>
<tr>
<td>SPED 505</td>
<td>Low Vision Assessment and Remediation</td>
<td>3</td>
</tr>
<tr>
<td>SPED 506</td>
<td>Introduction to Emotional Behavioral Disorders</td>
<td>3</td>
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<tr>
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<td>Introduction to Intellectual Disabilities</td>
<td>3</td>
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<tr>
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<td>3</td>
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<tr>
<td>SPED 509</td>
<td>IEP Development</td>
<td>2</td>
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<tr>
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<td>Introduction to Early Childhood Special Education</td>
<td>3</td>
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<tr>
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<td>Identification and Assessment of Young Children with Special Needs</td>
<td>3</td>
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<tr>
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<td>Methods and Materials for Preschool Children with Special Needs</td>
<td>3</td>
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<td>3</td>
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<td>3</td>
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<td>Visual Impairment/Early Intervention</td>
<td>3</td>
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<td>3</td>
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<td>2</td>
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<td>SPED 580</td>
<td>Practicum: Special Education 1-6</td>
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<td>Special Topics in Special Education 1-4</td>
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<td>Collaborative Relationships: Home, School and Community</td>
<td>3</td>
</tr>
</tbody>
</table>

### Intellectual (ID)

**Required Courses**
- SPED 507 Introduction to Intellectual Disabilities 3
- SPED 551 Advanced Assessment in Special Education 3
- SPED 556 Advanced Methods: Intellectual Disabilities 3
- SPED 509 IEP Development
- SPED 587 Internship: Intellectual Disabilities 1-6

**Elective Courses**
Select six of the following: 15
- SPED 521 Transition to Adult Life
- SPED 528 Advanced Assistive Technology
- SPED 557 Progress Monitoring
- SPED 558 Multi-Tier System of Supports
- SPED 560 Introduction to Autism Spectrum Disorder

### Low Vision Assessment and Remediation

- SPED 505 Low Vision Assessment and Remediation 3

### Multi-Tier System of Supports

- SPED 557 Progress Monitoring 3

### Intervention Strategies with Infants and Toddlers

- T&L 529 Language Development & Cognition in Children 3

### Community

- T&L 553 Collaborative Relationships: Home, School and Community 3

### Collaborative Relationships: Home, School and Community

- T&L 553 Collaborative Relationships: Home, School and Community 3
T&L 553  Collaborative Relationships: Home, School and Community

Additional credits from the other specialization areas

Total Credits 25-30

* If seeking special education endorsement in ID in North Dakota, confer with your advisor regarding these requirements. If seeking teacher certification in a state other than North Dakota, refer to that state’s requirements.

**Learning Disabilities (LD)**

**Required Courses**
- SPED 508  Introduction to Learning Disabilities 3
- SPED 551  Advanced Assessment in Special Education 3
- SPED 554  Advanced Methods: Learning Disabilities 3
- SPED 509  IEP Development
- SPED 588  Internship: Learning Disabilities 1-6

**Elective Courses**
Select six of the following: 15
- SPED 521  Transition to Adult Life
- SPED 528  Advanced Assistive Technology
- SPED 557  Progress Monitoring
- SPED 558  Multi-Tier System of Supports
- T&L 553  Collaborative Relationships: Home, School and Community

Total Credits 25-30

* If seeking special education endorsement in LD in North Dakota, confer with your advisor regarding these requirements. If seeking teacher certification in a state other than North Dakota, refer to that state’s requirements.

**Special Education Strategist (SES)**

**Required Courses**
- SPED 506  Introduction to Emotional Behavioral Disorders 3
- SPED 507  Introduction to Intellectual Disabilities 3
- SPED 508  Introduction to Learning Disabilities 3
- SPED 551  Advanced Assessment in Special Education 3
- SPED 554  Advanced Methods: Learning Disabilities 3
- SPED 555  Advanced Methods: Emotional Behavioral Disorders 3
- SPED 556  Advanced Methods: Intellectual Disabilities 3
- SPED 509  IEP Development
- SPED 586  Internship: Emotional Behavioral Disorders 1-6
- SPED 587  Internship: Intellectual Disabilities 1-6
- SPED 588  Internship: Learning Disabilities 1-6

**Elective Courses**
Select one of the following: 1
- SPED 521  Transition to Adult Life
- SPED 528  Advanced Assistive Technology
- SPED 557  Progress Monitoring
- SPED 558  Multi-Tier System of Supports
- T&L 553  Collaborative Relationships: Home, School and Community

Total Credits 25-40

* If seeking special education endorsement in SES in North Dakota, confer with your advisor regarding these requirements. If seeking teacher certification in a state other than North Dakota, refer to that state’s requirements.

**Visual Impairment (VI)**

**Required Courses**
- SPED 500  Introduction to Visual Impairment 3
- SPED 502  Braille Reading and Writing 2
- SPED 505  Low Vision Assessment and Remediation 3
- SPED 585  Internship: Visual Impairment 1-6

**Elective Courses**
Select six of the following: 15
- SPED 501  Diseases and Function of the Eye
- SPED 503  Orientation and Mobility/Visual Impairment
- SPED 504  Communication Media and Methods/Visual Impairment
- SPED 509  IEP Development
- SPED 521  Transition to Adult Life
- SPED 528  Advanced Assistive Technology
- SPED 530  Braille Code 1
- SPED 531  Braille Code 2
- SPED 532  Visual Impairment/Early Intervention
- SPED 557  Progress Monitoring
- SPED 558  Multi-Tier System of Supports
- T&L 553  Collaborative Relationships: Home, School and Community

Total Credits 24-29

* If seeking special education endorsement in VI in North Dakota, confer with your advisor regarding these requirements. If seeking teacher certification in a state other than North Dakota, refer to that state’s requirements.

**Master of Science in Special Education**

**Admission Requirements for the M.S.**

The Master of Science (M.S.) is for those who already have a degree in education. The M.S. will have a research to practice focus.

1. A bachelor’s degree.
2. For students seeking a North Dakota teacher endorsement, T&L 251 Understanding Individuals with Different Abilities, or its equivalent taken as either a prerequisite or corequisite with the master’s coursework.
3. For students seeking a North Dakota teacher endorsement, an elementary reading methods course and an elementary math methods course taken as either prerequisites or corequisites with the master’s coursework.
4. A cumulative grade point average (GPA) of at least 3.0 for the junior and senior years of undergraduate work (based on A = 4.00).
5. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

**Admissions Process**

1. Complete the School of Graduate Studies online application.
2. Submit the application fee of $35.
3. Recommend three people who will complete the recommendation form:
   a. one from an employment supervisor or administrator;
   b. one from a professional colleague or university professor; and
   c. one from a professional of your choosing.
4. Send official transcripts from each institution attended to the School of Graduate Studies.
5. Complete the personal statement and attach it in the “essay” section of the application. The personal statement should address four questions:
   a. Explain how your experiences/interests reflect your capacity for the specialization area you are apply for specifically (i.e., LD, EBD, ID, VI, ABA, ECSE, ASD, SES, G&T, General).
b. Identify a behavioral or learning need with an individual whom you know professionally or personally, then describe how you approached managing it.

c. Graduate school may be challenging due to competing demands for your time. Please address how you will navigate these challenges by utilizing your strengths.

d. In this master’s program, you will receive constructive feedback to develop and/or enhance your skills. Explain how you have perceived and managed this type of feedback in your past experiences.

Descriptions of the Specialization Areas

Applied Behavior Analysis (ABA): The ABA specialization area includes coursework and an intensive practicum that focuses on concepts and principles, assessment and behavior change systems, methods and applications, ethics, and research methods. This specialization is approved by the Behavior Analyst Certification Board.

Autism Spectrum Disorder (ASD): The ASD specialization area focuses on children, adolescents, and adults with ASD and addresses several aspects of ASD including characteristics, assessment, methods/strategies, interagency collaboration/support, and application in a field setting.

Early Childhood Special Education (ECSE): The ECSE specialization area focuses on children from birth to age nine and addresses various disabilities, primarily developmental in nature, and addresses several aspects of ECSE including characteristics, assessment, methods/strategies, all forms of development, (e.g., language, physical), and application in a field setting.

Emotional Behavioral Disorders (EBD): The ED specialization area focuses on children and adolescents with both emotional and behavior disorders and addresses several aspects of ED including characteristics, assessment, behavior and academic methods/strategies, and application in a field setting.

General Special Education: The general specialization area is a “design your own program” option. Students can choose courses from all of the courses offered by the special education program.

Gifted/Talented Education (GT): The GT specialization area focuses on children and youth with outstanding talent who perform or show the potential for performing at remarkably high levels of accomplishment when compared with others of their age, experience, or environment. The specialization area addresses characteristics, assessment, methods/strategies, and application in a field setting.

Intellectual Disabilities (ID): The ID specialization area focuses on children and adolescents with DCD (the federal law refers to this population as those with mental retardation) and addresses several aspects of ID including characteristics, assessment, methods/strategies, and application in a field setting.

Learning Disabilities (LD): The LD specialization area focuses on children and adolescents with learning problems that are not due to developmental, emotional, or cognitive disabilities and addresses several aspects of LD including characteristics, assessment, methods/strategies, and application in a field setting.

Special Education Strategist (SES): The SES specialization area is a cross-categorical area that encompasses all of the courses in the specialization areas of ID, ED, and LD. Since it addresses three disability areas, it is the largest specialization area in number of credits required.

Visual Impairment (VI): The VI specialization area focuses on children and adolescents who are visually impaired or blind and addresses several aspects of VI including characteristics, assessment, braille code, methods/strategies, orientation/mobility, and application in a field setting.

Degree Requirements

Students seeking the Master of Science degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Special Education Program.

1. A minimum of 32 credits is required for the degree. Additional credits may be needed for professional licensure.

2. At least one-half of the credits must be at or above the 500 level.

3. A maximum of one-fourth of the credit hours may be transferred from another institution.

4. Two credits of SPED 995 Scholarly Project or four credits of T&L 998 Thesis.

5. Nine credits of Special Education Core Coursework (excluding students in the ABA specialization).

6. SPED 525 Legal/Ethical Aspects in Special Education 3
   SPED 578 Behavior Management 3
   Select 1 of the Following:
   SPED 500 Introduction to Visual Impairment 3
   SPED 510 Introduction to Early Childhood Special Education 3
   SPED 552 Inclusive Methods 3

7. Five to six credits of scholarly tools/assessment courses.

8. SPED 511 Identification and Assessment of Young Children with Special Needs 3
   SPED 544 Research Methods in Behavior Analysis 3
   SPED 545 Assessment and Behavior Change Systems 4
   SPED 551 Advanced Assessment in Special Education 3
   SPED 557 Progress Monitoring 3
   SPED 558 Multi-Tier System of Supports 2
   SPED 567 Assessment in Autism Spectrum Disorder 3
   SPED 590 Special Topics in Special Education 1-4
   T&L 569 Action Research 3

9. In addition to #4 and #5 above, choose one or more specialization areas and complete the required courses and elective courses for a minimum total of 32 credits for the M.S. degree:

Applied Behavior Analysis (ABA)

Required Courses
   SPED 540 Concepts and Principles in Behavior Analysis 3
   SPED 541 Methods and Applications in Behavior Analysis 3
   SPED 542 Ethical and Professional Conduct for Behavior Analysts 3
   SPED 543 Applied Behavior Analysis Supervision Across Settings and Populations 2
   SPED 544 Research Methods in Behavior Analysis 3
   SPED 545 Assessment and Behavior Change Systems 4
   SPED 546 Philosop 3
   SPED 580 ABA Intensive Practicum Level I 5
   SPED 580 ABA Inte 5
   SPED 580 ABA Intensive Practicum Level III 5
   SPED 580 ABA Inte 5

This specialization is approved by the Behavior Analyst Certification Board.

Autism Spectrum Disorder (ASD)

Required Courses
   SPED 560 Introduction to Autism Spectrum Disorder 3
   SPED 561 Methods for Autism Spectrum Disorder 3
   SPED 567 Assessment in Autism Spectrum Disorder 3
   SPED 583 Internship: Autism Spectrum Disorder 1-6

Elective Courses

Select nine of the following:

   SPED 540 Concepts and Principles in Behavior Analysis
   SPED 562 Autism Spectrum Disorder: Supports Across the Lifespan
   SPED 563 Autism Spectrum Disorder: Medical Issues and Trends
   SPED 564 Structured Teaching
   SPED 565 Methods for Students with Asperger Syndrome
   SPED 566 Autism Spectrum Disorder: Intensive Early Intervention

University of North Dakota 657
**Early Childhood Special Education (ECSE)**

**Required Courses**
- SPED 510 Introduction to Early Childhood Special Education 3
- SPED 511 Identification and Assessment of Young Children with Special Needs 3
- SPED 512 Methods and Materials for Preschool Children with Special Needs 3
- SPED 589 Internship: Early Childhood Special Education 1-4

**Elective Courses**
Select six of the following: 15
- SPED 509 IEP Development
- SPED 514 Intervention Strategies with Infants and Toddlers
- SPED 516 Collaborative Authentic Assessment in Early Intervention
- SPED 528 Advanced Assistive Technology
- SPED 551 Multi-Tier System of Supports
- SPED 566 Autism Spectrum Disorder: Intensive Early Intervention
- SPED 590 Special Topics in Special Education (Infant/Toddler Mental Health)
- T&L 529 Language Development & Cognition in Children
- T&L 553 Collaborative Relationships: Home, School and Community

**Additional credits from the other specialization areas**

| Total Credits | 25-28 |

* If seeking special education endorsement in ECSE in North Dakota, confer with your advisor regarding these requirements. If seeking teacher certification in a state other than North Dakota, refer to that state’s requirements.

**Emotional Behavioral Disorders (EBD)**

**Required Courses**
- SPED 506 Introduction to Emotional Behavioral Disorders 3
- SPED 551 Advanced Assessment in Special Education 3
- SPED 555 Advanced Methods: Emotional Behavioral Disorders 3
- SPED 509 IEP Development
- SPED 586 Internship: Emotional Behavioral Disorders 1-6

**Elective Courses**
Select six of the following: 15
- SPED 521 Transition to Adult Life
- SPED 528 Advanced Assistive Technology
- SPED 557 Progress Monitoring
- SPED 558 Multi-Tier System of Supports
- T&L 553 Collaborative Relationships: Home, School and Community

**Additional credits from the other specialization areas**

| Total Credits | 25-30 |

* If seeking special education endorsement in EBD in North Dakota, confer with your advisor regarding these requirements. If seeking teacher certification in a state other than North Dakota, refer to that state’s requirements.

**Gifted/Talented (GT)**

**Required Courses**
- SPED 522 Introduction to Gifted/Talented Education 3
- SPED 523 Assessment in Gifted/Talented Education 3
- SPED 524 Teaching Methods in Gifted/Talented Education 3
- SPED 584 Internship: Gifted/Talented 1-6

**Elective Courses**
Select five of the following: 15
- SPED 551 Advanced Assessment in Special Education
- SPED 557 Progress Monitoring
- SPED 558 Multi-Tier System of Supports
- T&L 553 Collaborative Relationships: Home, School and Community

**Additional credits from the other specialization areas or other T&L courses approved by the advisor**

* If seeking special education endorsement in GT in North Dakota, confer with your advisor regarding these requirements. If seeking teacher certification in a state other than North Dakota, refer to that state’s requirements.

**General Special Education**

Note that there are no additional required courses. A minimum of 15 credits can be selected from the following courses:
- SPED 501 Diseases and Function of the Eye 2
- SPED 503 Orientation and Mobility/Visual Impairment 2
- SPED 505 Low Vision Assessment and Remediation 3
- SPED 506 Introduction to Emotional Behavioral Disorders 3
- SPED 507 Introduction to Intellectual Disabilities 3
- SPED 508 Introduction to Learning Disabilities 3
- SPED 509 IEP Development 2
- SPED 510 Introduction to Early Childhood Special Education 3
- SPED 511 Identification and Assessment of Young Children with Special Needs 3
- SPED 512 Methods and Materials for Preschool Children with Special Needs 3
- SPED 514 Intervention Strategies with Infants and Toddlers 3
- SPED 516 Collaborative Authentic Assessment in Early Intervention 3
- SPED 521 Transition to Adult Life 3
- SPED 528 Advanced Assistive Technology 1
- SPED 532 Visual Impairment/Early Intervention 3
- SPED 540 Concepts and Principles in Behavior Analysis 3
- SPED 551 Advanced Assessment in Special Education 3
- SPED 554 Advanced Methods: Learning Disabilities 3
- SPED 555 Advanced Methods: Emotional Behavioral Disabilities 3
- SPED 556 Advanced Methods: Intellectual Disabilities 3
- SPED 557 Progress Monitoring 3
- SPED 558 Multi-Tier System of Supports 2
- SPED 560 Introduction to Autism Spectrum Disorder 3
- SPED 561 Methods for Autism Spectrum Disorder 3
- SPED 562 Autism Spectrum Disorder: Supports Across the Lifespan 3
- SPED 563 Autism Spectrum Disorder: Medical Issues and Trends 3
- SPED 564 Structured Teaching 3
- SPED 565 Methods for Students with Asperger Syndrome 3
- SPED 566 Autism Spectrum Disorder: Intensive Early Intervention 3
- SPED 567 Assessment in Autism Spectrum Disorder 3
- SPED 580 Practicum: Special Education 1-6
- SPED 590 Special Topics in Special Education (Infant and Toddler Mental Health) 3
- T&L 553 Collaborative Relationships: Home, School and Community 3

**Intellectual Disabilities (ID)**

**Required Courses**
- SPED 507 Introduction to Intellectual Disabilities 3
- SPED 551 Advanced Assessment in Special Education 3
- SPED 556 Advanced Methods: Intellectual Disabilities 3
- SPED 509 IEP Development
### Learning Disabilities (LD)

**Required Courses**
- SPED 508 Introduction to Learning Disabilities 3
- SPED 551 Advanced Assessment in Special Education 3
- SPED 554 Advanced Methods: Learning Disabilities 3
- SPED 509 IEP Development 3
- SPED 588 Internship: Learning Disabilities 1-6

**Elective Courses**
Select five of the following: 15
- SPED 521 Transition to Adult Life
- SPED 528 Advanced Assistive Technology
- SPED 557 Progress Monitoring
- T&L 553 Collaborative Relationships: Home, School and Community

Additional credits from the other specialization areas

Total Credits 25-30

* If seeking special education endorsement in LD in North Dakota, confer with your advisor regarding these requirements. If seeking teacher certification in a state other than North Dakota, refer to that state’s requirements.

### Special Education Strategist (SES)

**Required Courses**
- SPED 506 Introduction to Emotional Behavioral Disorders 3
- SPED 507 Introduction to Intellectual Disabilities 3
- SPED 508 Introduction to Learning Disabilities 3
- SPED 551 Advanced Assessment in Special Education 3
- SPED 554 Advanced Methods: Learning Disabilities 3
- SPED 555 Advanced Methods: Emotional Behavioral Disorders 3
- SPED 556 Advanced Methods: Intellectual Disabilities 3
- SPED 509 IEP Development 3
- SPED 586 Internship: Emotional Behavioral Disorders 1-6
- SPED 587 Internship: Intellectual Disabilities 1-6
- SPED 588 Internship: Learning Disabilities 1-6

**Elective Courses**
Select one of the following: 1
- SPED 521 Transition to Adult Life
- SPED 528 Advanced Assistive Technology
- SPED 557 Progress Monitoring
- SPED 558 Multi-Tier System of Supports
- SPED 560 Introduction to Autism Spectrum Disorder
- T&L 553 Collaborative Relationships: Home, School and Community

### Visual Impairment (VI)

**Required Courses**
- SPED 500 Introduction to Visual Impairment 3
- SPED 502 Braille Reading and Writing 2
- SPED 505 Low Vision Assessment and Remediation 3
- SPED 585 Internship: Visual Impairment 1-6

**Elective Courses**
Select six of the following: 15
- SPED 501 Diseases and Function of the Eye
- SPED 503 Orientation and Mobility/Visual Impairment
- SPED 504 Communication Media and Methods/Visual Impairment
- SPED 509 IEP Development
- SPED 521 Transition to Adult Life
- SPED 528 Advanced Assistive Technology
- SPED 530 Braille Code 1
- SPED 531 Braille Code 2
- SPED 532 Visual Impairment/Early Intervention
- SPED 552 Inclusive Methods
- SPED 557 Progress Monitoring
- SPED 558 Multi-Tier System of Supports
- T&L 553 Collaborative Relationships: Home, School and Community

Additional credits from the other specialization areas

Total Credits 24-29

* If seeking special education endorsement in VI in North Dakota, confer with your advisor regarding these requirements. If seeking teacher certification in a state other than North Dakota, refer to that state’s requirements.

### Engineering

Ph.D. in Engineering (http://und-public.courseleaf.com/graduateacademicinformation/departmentalcoursesprograms/engineering/phd)

**Courses**

- **ENGR 501. Energy, Resources and Policy.** 3 Credits. Structured discussions of energy, resources and policy issues, related to energy security and national and global well-being, based on selected readings. Prerequisite: Consent of instructor.

- **ENGR 502. Alternative Energy Systems.** 3 Credits. Provides an interdisciplinary background in alternative energy systems. Any form of energy production different from traditional fossil fuel combustion falls in this category. Such alternate systems include energy production from biomass, gasification of wood and coal, geothermal energy, solar energy (wind energy, fuel cells, and photovoltaics), etc. Prerequisite: Consent of instructor.

- **ENGR 556. System Dynamics I.** 3 Credits. This course provides an introduction to the System Dynamics field of study which is a computer-aided approach to improving system performance through policy analysis and design. The knowledge and critical thinking skills gained from this course will enable students to work either independently or on interdisciplinary teams to effectively deal with problems arising from dynamically complex systems. Topics include: perspective and process; tools for systems thinking; the dynamics of growth; tools for modeling dynamic systems; instability and oscillation; model testing; and challenges for the future.
ENGR 558. System Dynamics II. 3 Credits.
This course builds on ENGR 556 System Dynamics I. This course will enable students to effectively plan and manage System Dynamics projects by providing knowledge and skill relating to advanced modeling techniques, software capabilities, and client engagement processes. Topics include: model building, documentation and presentation best practices; use of historical data; model calibration and testing techniques; advanced software features; group model building; and implementation challenges. Prerequisite: ENGR 556. S.

ENGR 562. Seminar in Engineering. 1 Credit.
Conference and reports on current developments in Engineering. Prerequisite: Admission to the Engineering Ph. Repeatable to 3 credits. S/U grading.

ENGR 590. Special Topics in Engineering. 1-6 Credits.
Investigations of special topics in energy engineering dictated by students and faculty interests. Repeatable. Prerequisite: Consent of instructor. Repeatable.

ENGR 599. Doctoral Research. 1-15 Credits.
Repeatable to 60 credits. Repeatable.

ENGR 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

ENGR 998. Thesis. 1-9 Credits.
Repeatable to 9 credits. Repeatable to 9 credits.

ENGR 999. Dissertation. 1-18 Credits.
Repeatable to 18 credits. Repeatable to 18 credits.

Undergraduate Courses for Graduate Credit

ENGR 410. Technology Ventures. 1-3 Credits.
The primary focus will be on developing techniques to formulate the strategic framework required to develop high-tech ventures. Successful techniques to take technology-intensive opportunities from concept to commercialization will be explored. Prerequisite: Permission of instructor. Repeatable to 6 credits. S.

Biomedical Engineering

M.S. in Biomedical Engineering (p. 434)
Ph.D. in Biomedical Engineering (p. 433)

Courses

BME 510. Graduate Cooperative Education. 1-3 Credits.
A practical research experience with an employer or another research laboratory closely associated with the student's academic research area. A written report and an oral presentation are required. Prerequisite: Advisor approval is required. Repeatable to 3 credits. S/U grading. F,S,SS.

BME 599. Doctoral Research. 1-15 Credits.
Doctoral research for Ph.D. students in BME. Repeatable to 15 credits. F,S,SS.

BME 630. Anatomy and Physiology for Biomedical Engineers. 6 Credits.
Biomedical engineering is a growing field of engineering that requires a fundamental understanding of human anatomy and physiology. This course is intended to provide a foundation for biomedical engineers with a focus on learning necessary terminologies, concepts, and functions essential to human anatomy and physiology. Prerequisite: Consent of instructor. F.

BME 670. Seminar for Biomedical Engineers. 1 Credit.
The purpose of the course is to practice communication skills in writing papers and preparing presentations. Prerequisite: Consent of instructor. Repeatable to 6 credits. F.

BME 690. Special Topics in Biomedical Engineering. 1-9 Credits.
Special topics for graduate students in BME. Repeatable to 9 credits. F,S,SS.

BME 996. Continuing Enrollment. 1-12 Credits.
Continuing enrollment for graduate students in BME. Repeatable to 12 credits. S/U grading. F,S,SS.

BME 997. MS Project. 1-3 Credits.
This course is required for students in non-thesis based MS program in BME. Prerequisite: Consent of advisor. Repeatable to 3 credits. F,S,SS.

BME 998. MS Thesis. 1-9 Credits.
Thesis for students in the thesis-based MS program in BME. Repeatable to 9 credits. F,S,SS.

BME 999. PhD Dissertation. 1-15 Credits.
Dissertation for Ph.D. students in BME. Repeatable to 15 credits. F,S,SS.

Doctor of Philosophy in Biomedical Engineering

The M.S. and Ph.D. programs in Biomedical Engineering are offered by UND and North Dakota State University (NDSU). The proposed programs would be offered jointly by UND’s College of Engineering and Mines, School of Medicine and Health Sciences, and NDSU’s College of Engineering.

Every M.S. or Ph.D. student will be associated with at least one of the following Biomedical Research Groups (BRGs):

• Biomechanics
• Biomaterials
• Bio-instrumentation
• Multi-scale, bio-system simulation and modeling
• Bio-Signals
• Other emerging areas as identified

Two separate graduate degree programs are offered:

• Master of Science (M.S.) in Biomedical Engineering
• Doctor of Philosophy (Ph.D.) in Biomedical Engineering

The student’s graduate committee for both the M.S. and Ph.D. must consist of at least one faculty member from NDSU.

Program Requirements

This program prepares students who have a strong interest in gaining in-depth knowledge in biomedical engineering at the graduate level. Specific requirements over and above the general UND Academic Catalog requirements are listed below.

Minimum Admission Requirements

1. Bachelor of Science degree from an ABET-accredited engineering program; or
2. Students holding a B.S. degree in other disciplines may be admitted to Qualified Status with an obligation to acquire the necessary background undergraduate engineering knowledge. The exact requirements will be determined on a case-by-case basis; and/or
3. Graduate Record Examination General Test for applicants from non-ABET accredited programs; and
4. Minimum GPA is 3.0 (4.0 scale) is required. Conditional admittance may be obtained for GPAs less than 3.0.

Degree Requirements (total 90 credits)

Required:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<td>Anatomy-Physiology (3-6 credits) from the following:</td>
<td></td>
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<tr>
<td>EE 590</td>
<td>Advanced Electrical Engineering Problems (Physiology and Anatomy for Biomedical Engineers)</td>
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<tr>
<td>or</td>
<td>BIOL 660</td>
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<tr>
<td>Seminar (3-6 credits, 1 credit per semester) taken from the following:</td>
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<tr>
<td>ENGR 562</td>
<td>Seminar in Engineering</td>
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<td>EE 570</td>
<td>Seminar</td>
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<tr>
<td>ENGR 790</td>
<td>(NDSU - Seminar)</td>
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<tr>
<td>Classes related to BRG</td>
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<tr>
<td>Dissertation</td>
<td>6-30</td>
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<tr>
<td>Electives:</td>
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<tr>
<td>Graduate Preparation, e.g., Grant Writing</td>
<td>3-6</td>
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<tr>
<td>Internship (industrial, clinical or research lab)</td>
<td>3-6</td>
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<tr>
<td>Electives:</td>
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<td>Graduate Preparation, e.g., Grant Writing</td>
<td>3-6</td>
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<tr>
<td>Internship (industrial, clinical or research lab)</td>
<td>3-6</td>
</tr>
<tr>
<td>Electives:</td>
<td></td>
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</tbody>
</table>
The following courses may be considered for the above BRGs:

Bioinstrumentation BRG

EE 539  Electromagnetic Compatibility  3
EE 456  Digital Image Processing  3
EE 521  Digital Signal Processing  3
EE 545  Introduction to Biomedical Engineering  3
EE 550  Biomedical Instrumentation  3
ECE 683  (NDSU - Instrumentation for Engineers)  3
ECE 685  (NDSU - Biomedical Engineering)  3
ECE 796  (NDSU - Biomedical Photonics)  3

Biomaterials BRG

ME 490  Special Laboratory Problems  1-3
EE 545  Introduction to Biomedical Engineering  3
CHE 593A  Special Topics (Biochemical Engineering)  1-3
CHEM 665  (NDSU - Principles of Physical Chemistry and Biophysics)  3
ECE 685  (NDSU - Biomedical Engineering)  3
ECE 701  (NDSU - Quantitative Drug Design)  2
CE 725  (NDSU - Introduction to Biomaterials, Materials in Biomedical Engineering)  3
MN 785  (NDSU - Biocompatibility Testing)  3
MN 786  (NDSU - Tissue Engineering)  3

Biomechanics BRG

ME 439  Introduction to Robotics  3
ME 490  Special Laboratory Problems  1-3
ME 529  Advanced Finite Element Methods  3
EE 545  Introduction to Biomedical Engineering  3
ECE 485  (NDSU - Biomedical Engineering)  3
ME 668  (NDSU - Introduction to Biomechanics)  3
ME 680  (NDSU - Biofluid Mechanics)  3
ME 743  (NDSU - Biomechanics of Impact)  3
ME 755  (NDSU - Fluid Mechanics for Bio/Nanotechnologies)  3

Biosignals BRG

EE 456  Digital Image Processing  3
EE 508  Intelligent Decision Systems  3
EE 521  Digital Signal Processing  3
EE 539  Electromagnetic Compatibility  3
EE 545  Introduction to Biomedical Engineering  3
EE 590  Advanced Electrical Engineering Problems (Engineering Computation)  3
EE 590  Advanced Electrical Engineering Problems (Biomedical Signal Processing)  3
ECE 685  (Biomedical Engineering)  3

Multi-Scale System Simulation and Modeling BRG

EE 545  Introduction to Biomedical Engineering  3
ECE 685  (NDSU - Biomedical Engineering)  3

Elective courses (approved by advisor) up to 36 credits

Note: A maximum of 30 credits can be transferred from a M.S. program.

If a student is assigned to more than one BRG, he/she can take courses in those BRGs to satisfy required classes.

List of Elective Courses:

In addition to the following list, BRG courses can be considered as elective courses.

PPT 500  Principles of Physiology and Pharmacology  6
PPT 503  Advanced Pharmacology or Physiology  3
PPT 505  Research Techniques  1-3
BIMD 510  Basic Biomedical Statistics  2
BIMD 516  Responsible Conduct of Research  2
NURS 510  Adv Physiology/Pathophysiology I  3
NURS 511  Adv Physiology/Pathophys II  3
NURS 573  Research Funding  3
BIOC 673  (NDSU - Methods of Biochemical Research)  3
BIOC 716  (NDSU - Biochemistry of Proteins and Enzymes)  4
CPM 771  (NDSU - Methods of Polymer Characterization)  3
CHEM 685  (NDSU - Industrial Biotechnology)  2
PSCL 611  (NDSU - Pharmacodynamics and Applied Therapeutics)  3
NURS 702  (NDSU - Ethics/Policy)  3
NURS 706  (NDSU - Healthcare Delivery Systems, Financing, & Informatics)  3
NURS 714  (NDSU - Advanced Pathophysiology I)  3
NURS 716  (NDSU - Advanced Pathophysiology II)  3
PHARM 685  (NDSU - Economic Outcomes Assessment)  3

Other classes as deemed appropriate by student’s advisory committee

Master of Science in Biomedical Engineering

The M.S. and Ph.D. programs in Biomedical Engineering are offered by UND and North Dakota State University (NDSU). The proposed programs would be offered jointly by UND’s College of Engineering and Mines, School of Medicine and Health Sciences, and NDSU’s College of Engineering.

Every M.S. or Ph.D. student will be associated with at least one of the following Biomedical Research Groups (BRGs):

- Biomechanics
- Biomaterials
- Bio-instrumentation
- Multi-scale, bio-system simulation and modeling
- Bio-Signals
- Other emerging areas as identified

Two separate graduate degree programs are offered:

- Master of Science (M.S.) in Biomedical Engineering
- Doctor of Philosophy (Ph.D.) in Biomedical Engineering

The student’s graduate committee for both the M.S. and Ph.D. must consist of at least one faculty member from NDSU.

Program Requirements

This program prepares students who have a strong interest in research-oriented engineering related to the medical device field. All of the general requirements for enrollment, participation, and completion of a degree documented in the UND Academic Catalog as appropriate shall be required.

The M.S. degree will be offered with two options: 1) thesis-based; and 2) non-thesis-based. Specific requirements over and above the general catalog requirements for both thesis-based and non-thesis-based options are listed below.
Admission Requirements

1. Bachelor of Science degree from an ABET-accredited engineering program; or
2. Students holding a B.S. degree in other disciplines may be admitted to Qualified Status with an obligation to acquire the necessary background undergraduate engineering knowledge. The exact requirements will be determined on a case-by-case basis; and/or
3. Graduate Record Examination General Test for applicants from non-ABET accredited programs; and
4. Minimum GPA of 3.0 (4.0 scale) is required. Conditional admittance may be obtained for GPAs less than 3.0.

Degree Requirements – Thesis-based (total 30 credits)

Required:
Anatomy-Physiology (3-6 credits):

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>EE 590</td>
<td>6</td>
</tr>
<tr>
<td>or BIOL 660</td>
<td>3</td>
</tr>
<tr>
<td>Seminar</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 562</td>
<td>1</td>
</tr>
<tr>
<td>ENGR 790</td>
<td>1</td>
</tr>
<tr>
<td>Classes related to BRG (2-3 classes)</td>
<td>6-9</td>
</tr>
<tr>
<td>Thesis</td>
<td>9</td>
</tr>
</tbody>
</table>

Electives:

| Internship (industrial, clinical, or research lab) | 0-3 |
| Graduate Preparation, e.g., Grant Writing         | 0-3 |
| Elective courses approved by advisor               | 1-9 |

Degree Requirements – Non Thesis-based (total 30 credits)

Required:
Anatomy-Physiology (3-6 credits from the following):

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 590</td>
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<tr>
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<tr>
<td>ENGR 562</td>
<td>1</td>
</tr>
<tr>
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<td>1</td>
</tr>
<tr>
<td>Classes related to BRG (2-3 classes)</td>
<td>6-9</td>
</tr>
<tr>
<td>Project</td>
<td>3</td>
</tr>
</tbody>
</table>

Electives:

| Internship (industrial, clinical or research lab) | 0-3 |
| Graduate Preparation, e.g., Grant Writing         | 0-3 |
| Elective courses approved by advisor               | 1-15 |

Courses

CHE 501. Advanced Transport Phenomena. 3 Credits.
This course is designed to give an advanced treatment of momentum, heat, and mass transfer suitable for graduate students in chemical engineering, mechanical engineering, and environmental engineering. This course will involve using advanced mathematics to model transport systems of importance in engineering science and design. Prerequisites: CHE 301 and MATH 266. S, even years.

CHE 503. Fuels Technology. 3-4 Credits.
Processing and utilization of low rank fuels.

CHE 504. Air Pollution Control. 3 Credits.
Identification of major air pollutants from stationary and mobile sources and methods of controlling their emissions; dispersion of air pollutants in the atmosphere; photochemical air pollution; federal and state regulations. Prerequisite: Background equivalent to CHEM 122, MATH 265, and PHYS 252 is expected.

CHE 505. Biochemical Engineering. 3 Credits.
Principles of biochemical engineering and methods for the analysis, design, operation, and monitoring of biochemical engineering processes and reactors. Application to biochemical engineering research. Prerequisite: CHE 321 or consent of instructor.

CHE 507. Advanced Unit Operations. 3-6 Credits.
One or more of the following: fluid flow, heat flow, evaporation, humidification and dehumidification, drying, gas absorption, distillation, and extraction. Prerequisite: Background equivalent to CHE 405 is expected.

CHE 508. Advanced Unit Operations. 3-6 Credits.
Continuation of the first semester’s work in advanced unit operations.

CHE 509. Advanced Chemical Engineering Thermodynamics. 3 Credits.
Chemical engineering processes from the standpoint of quantitative thermodynamics. Special emphasis on thermodynamics of chemical reactions. Prerequisite: Background equivalent to CHE 303 is expected. F, even years.

CHE 510. Advanced Chemical Process Control. 3 Credits.
Analysis and design of advanced chemical process control systems including: dead time compensation, feed forward and adaptive control, multivariable control, digital computer control and the use of Z-transforms to get the discretetime dynamic response of chemical process systems. Prerequisites: MATH 266 and CHE 408 or equivalents approved by the department.

CHE 511. Advanced Chemical Engineering Kinetics. 3 Credits.
Theory and practice of industrial chemical reactor design. Advanced topics in kinetics of industrial chemical reactors. Prerequisite: Background equivalent to CHE 421 is expected.

CHE 512. Transport Of Mass. 3 Credits.
Prerequisites: Background equivalent to CHE 305, CHE 321, and MATH 265 is expected.

CHE 515. Design of Engineering Experiments. 3 Credits.
Design and analysis of experimental data including block and factorial arrangements, significance of data, and mathematical modeling. Prerequisite: MATH 265.

CHE 520. Impurities in Combustion and Gasification Systems. 3 Credits.
This course is on the fate and behavior of fuel derived impurities in energy conversion systems and how impurities influence system design, operation and reliability. Prerequisite: CHEM 122.

CHE 525. Polymer Engineering. 3 Credits.
Basic polymer structures and characterization. Polymerization reactions and kinetics of condensation and chain growth polymerizations. Polymerization processes including bulk, suspension, solution, and emulsion polymerizations. Polymer processing technologies including extrusion, and injection molding. Prerequisites: CHE 321 and CHE 301.

CHE 530. Combustion Theory and Modeling. 3 Credits.
A theoretical and mathematical study of premixed and diffusion flames, laminar and turbulent combustion, solid fuel combustion and pollutant formation. Prerequisites or Corequisites: CHE 301 and CHE 303. S.

CHE 531. Rocket Propulsion. 3 Credits.
A theoretical and mathematical study of space flight, the thermodynamics of rocket propulsion, classification and formulation of propellants and their combustion characteristics, and rocket motors. Prerequisite or corequisite: CHE 303. F.
CHE 532. Explosives: Theory and Modeling. 3 Credits.
A theoretical and mathematical study of: the thermodynamics of deflagrations and detonations, classification and formulation of explosives and their combustion characteristics. Prerequisite or Corequisite: CHE 303. F.

CHE 535. Metallic Corrosion and Polymer Degradation. 3 Credits.
Reviews the forms of metal corrosion and of polymer degradation; discussion of control and mitigation techniques. F.

CHE 562. Seminar in Chemical Engineering. 1 Credit.
Conferences and reports on current developments in Chemical Engineering. Repeatable to 3 credits. S/U grading.

CHE 591. Research. 1-15 Credits.
Analysis, planning, and detailed study of definite problems; individual laboratory work on some selected problems to develop the power of independent investigation. Repeatable.

CHE 593A. Special Topics. 1-3 Credits.
Topics of current interest to be considered each semester. Regular grading. Repeatable to 9 credits.

CHE 593B. Special Topics. 1-3 Credits.
Topics of current interest to be considered each semester. S/U grading. Repeatable to 3 credits. S/U grading.

CHE 595. Design Project. 3-6 Credits.
A three to six credit course of engineering design experience involving individual effort and formal written report. Prerequisite: Restricted to the Master of Engineering students and subject to approval by the student's advisor.

CHE 597. Graduate Cooperative Education. 1-2 Credits.
A practical work experience with an employer closely associated with the student's academic area. Arranged by mutual agreement among student, department, and employer. Prerequisite: Approval of ChE graduate director. Repeatable to 4 credits. S/U grading. On demand.

CHE 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

CHE 997. Independent Study. 2 Credits.

CHE 998. Thesis. 1-9 Credits.
Development and documentation of scholarly activity demonstrating proficiency in Chemical Engineering at the master's level. Repeatable to 9 credits. F,S,SS.

CHE 999. Dissertation. 1-12 Credits.
Repeatable to 12 credits. F,S,SS.

**Doctor of Philosophy in Chemical Engineering**

**Admission Requirements**
The applicant must meet the School of Graduate Studies' current minimum general admission requirements as published in the graduate catalog.

1. B.S. degree in chemical engineering from an ABET accredited program with a GPA of at least 3.0 or a M.S. degree in chemical engineering with a GPA of at least 3.0. Students holding a B.S. degree in a science or other engineering field may be admitted to Qualified Status with an obligation to acquire background undergraduate engineering knowledge. The exact requirements will be determined on a case-by-case basis.
2. Graduate Record Examination General Test for those with undergraduate degrees from non-ABET accredited programs.
3. Satisfy the School of Graduate Studies' English Language Proficiency requirements as published in the graduate catalog.

**Degree Requirements**

1. A minimum of 90 semester credits, including acceptable master's degree work and credits granted for the dissertation and the research leading to the dissertation.
2. Successful completion of an oral comprehensive exam when at least 45 post baccalaureate credits have been completed. This exam will be based on the four core chemical engineering courses and their application to the student's research. The exam will be administered by at least three faculty members from the Department of Chemical Engineering. Candidates who fail the exam will be allowed one opportunity to repeat the exam. The reexamination must take place no later than 13 months after the initial exam attempt.
3. Students must present to their advisory committee an annual oral progress report describing research progress.
4. Preparation and defense of a dissertation documenting original and independent research on a topic related to chemical engineering.

**Required Courses**

<table>
<thead>
<tr>
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<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
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<td>CHE 501</td>
<td>Advanced Transport Phenomena</td>
<td>3</td>
</tr>
<tr>
<td>CHE 509</td>
<td>Advanced Chemical Engineering Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td>CHE 511</td>
<td>Advanced Chemical Engineering Kinetics</td>
<td>3</td>
</tr>
<tr>
<td>CHE 515</td>
<td>Design of Engineering Experiments</td>
<td>3</td>
</tr>
<tr>
<td>CHE 562</td>
<td>Seminar in Chemical Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CHE 591</td>
<td>Research</td>
<td>36-45</td>
</tr>
<tr>
<td>CHE 999</td>
<td>Dissertation</td>
<td>12</td>
</tr>
</tbody>
</table>

At least 9 credits of graduate coursework from outside chemical engineering, which may contribute to a minor or cognate.

**Additional graduate coursework**

9-18

Successful completion of the four core chemical engineering courses with a GPA of at least 3.3.

<table>
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</tr>
<tr>
<td>CHE 515</td>
<td>Design of Engineering Experiments</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits | 93-111 |

**Master of Engineering in Chemical Engineering**

**Admission Requirements**
The applicant must meet the Graduate School's current minimum general admission requirements as published in the graduate catalog.

1. B.S. degree in Chemical Engineering from an ABET accredited program. Students applying for the combined BSChE/MEngr degree should see the "Chemical Engineering Combined Degree (http://engineering.und.edu/chemical/graduate-program/combined-bs-degree.cfm)" section for additional details.
2. An overall undergraduate GPA of at least 2.50 or a GPA of at least 3.00 for the last two years.
3. Satisfy the School of Graduate Studies' English Language Proficiency requirements as published in the graduate catalog.

**Degree Requirements**

Students seeking the Master of Engineering degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Chemical Engineering Department. The general degree requirements for the Master of Engineering degree set forth by the Chemical Engineering Department include:

1. A minimum of 30 semester credits of coursework with at least 21 credits resulting from chemical engineering courses at the 500-level.
2. Successful completion of the four core chemical engineering courses (12 credits) with an average GPA of 3.0 or above: CHE 501 Advanced Transport Phenomena, CHE 509 Advanced Chemical Engineering Thermodynamics, CHE 511 Advanced Chemical Engineering Kinetics and CHE 515 Design of Engineering Experiments.
3. Out of the remaining 18 credits of elective courses, up to 9 credits of graduate coursework may be from outside chemical engineering.
4. A maximum of nine semester credits may be transferred from another institution.
Master of Science in Chemical Engineering

Admissions Requirements
The applicant must meet the School of Graduate Studies' current minimum general admission requirements as published in the graduate catalog.

1. B.S. degree in chemical engineering from an ABET accredited program. Students applying for the combined BSChE/MS degree should see the "Chemical Engineering Combined Degree (http://engineering.und.edu/chemical/graduate-program/combined-ms-bs-degree.cfm)" section for additional details. Students holding a B.S. degree in a science or other engineering field may be admitted to Qualified Status with an obligation to acquire a background in chemical engineering.

2. An overall undergraduate GPA of at least 2.75 or a GPA of at least 3.00 for the last two years. (An overall GPA of at least 3.3 for the combined BSChE/MS degree is required).

3. Graduate Record Examination General Test for those with undergraduate degrees from non-ABET accredited programs.

4. Satisfy the School of Graduate Studies' English Language Proficiency requirements as published in the Graduate catalog.

Degree Requirements

Students seeking the Master of Science degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Chemical Engineering Department.

Thesis Option:
1. A minimum of 30 semester credits, including the credits granted for the thesis and the research leading to the thesis.
2. At least one-half of the credits must be at or above the 500-level.
3. A maximum of nine semester credits may be transferred from another institution.
4. A thesis documenting research on a topic related to chemical engineering.

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
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</thead>
<tbody>
<tr>
<td>CHE 562</td>
<td>Seminar in Chemical Engineering</td>
<td>2</td>
</tr>
<tr>
<td>CHE 591</td>
<td>Research</td>
<td>3</td>
</tr>
<tr>
<td>CHE 998</td>
<td>Thesis</td>
<td>4</td>
</tr>
</tbody>
</table>

At least 21 credits of coursework from chemical engineering and related fields, which may include a minor or cognate. Total Credits 30

Non-Thesis Option:
1. A minimum of 32 credits, including credits granted for independent study.
2. At least one-half of the credits must be at or above the 500-level.
3. A maximum of nine semester credits may be transferred from another institution.
4. Preparation of a written independent study report approved by the faculty advisor.
5. Comprehensive final examination.

Required Courses

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<tbody>
<tr>
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<td>2</td>
</tr>
<tr>
<td>CHE 591</td>
<td>Research</td>
<td>3</td>
</tr>
<tr>
<td>CHE 997</td>
<td>Independent Study</td>
<td>2</td>
</tr>
</tbody>
</table>

At least 24 credits of coursework from chemical engineering and related fields. Total Credits 32

Civil Engineering

M.S. in Civil Engineering (p. 440)
CE 533. Industrial Wastes. 3 Credits. 
Industrial processes and waste characterization, regulatory law, specialized treatment systems, hazardous wastes, economic analysis; plant tours of potato, sugar, meat, dairy, paper and pulp products and metal plating industries. Prerequisite: CE 431.

CE 535. Hazardous Waste Management. 3 Credits. 
Regulations, generation, storage, transportation, disposal, classification, fate and transport of contaminants, environmental audits, pollution prevention and management facilities, remediation alternatives, physical-chemical treatment, bioremediation, stabilization/stabilization, thermal processes. Prerequisites: CE 306 and CHEM 121.

CE 551. Plate and Slab Structures. 3 Credits. 
Classical plate bending theory, rectangular and circular plates, slab analysis by energy and numerical methods, anisotropic plates, large deflection theory, buckling of thin plates. Prerequisites: ENGR 203 and CE 351.

CE 552. Thin Shell Structures. 3 Credits. 
Differential geometry of shell theory, membrane and bending theories of shells, shells of revolution, stress analysis of domes, pressure vessels, and storage tanks, numerical methods, buckling of shells. Prerequisites: ENGR 203 and CE 351.

CE 555. Prestressed Concrete-Analysis and Design. 3 Credits. 
Materials and systems of pre-stressing; pre-stress losses; pre-tensioned and post-tensioned members; design of pre-stressed concrete beams by service load and ultimate strength methods; flexural design of composite beams and slabs; anchor zone stresses and reinforcement; shear and torsion. Prerequisite: CE 453. On demand.

CE 556. Numerical and Matrix Methods of Structural Analysis. 3 Credits. 
Methods of successive approximations and numerical procedures for solution of complex structural problems, matrix formulation of structural problems, flexibility and stiffness methods of analysis. Prerequisite: CE 351.

CE 557. Advanced Steel Design. 3 Credits. 
Design and analysis of simple structural connections including both moment and shear connections; design and analysis of eccentric structural connections, plate girders, and composite structures; design and analysis for seismic loads; ASD and LRFD design. Prerequisite: CE 451; consent of instructor for undergraduate students. F.

CE 558. Theory of Plasticity. 3 Credits. 
Rigorous study of classical theory of plasticity. Classical continuum mechanics concepts of stress and strain and elastic behavior discussed. Progressing into plastic behavior in materials, mathematical formulation of elasto-plastic constitutive relationship, practical engineering limit analysis, and application of plasticity theories in analysis using computer programs. Prerequisite: CE 451 or instructor approval; consent of instructor for undergraduates. S.

CE 562. Graduate Seminar in Civil Engineering. 1 Credit. 
Conference and reports on current developments in Civil Engineering. Prerequisite: Admission to Civil Engineering Program; consent of instructor and School of Graduate Studies required for graduate students. Repeatable to 3 credits. S/U grading. F, S, SS.

CE 590. Special Topics. 1-6 Credits. 
Investigation of special topics dictated by student and faculty interests. May be repeated up to a total of 6 credits. Prerequisite: Department approval. Repeatable to 6 credits.

CE 591. Civil Engineering Research. 1-12 Credits. 
May be repeated to a maximum of 12 credits. Repeatable to 12 credits.

CE 595. Design Project. 3-6 Credits. 
A three to six credit course of engineering design experience involving individual effort and formal written report. Repeatable to 6 credits. Prerequisites: Restricted to the Master of Engineering student candidate and subject to approval by the student's advisor. Repeatable to 6 credits.

CE 597. Graduate Cooperative Education. 1-2 Credits. 
A practical work experience with an employer closely associated with the student's academic area. Arranged by mutual agreement among student, department, and employer. Prerequisite: Approval of CE Graduate Director or major advisor. Repeatable to 4 credits. S/U grading. On demand.

CE 599. Doctoral Research. 1-15 Credits. 
Research contributing to the discovery and dissemination of knowledge and/or technology in Civil Engineering and contributing to the student's doctoral dissertation. Prerequisite: Admission to the PhD in Civil Engineering Program. Repeatable. F, S, SS.

CE 996. Continuing Enrollment. 1-12 Credits. 
Repeatable. S/U grading.

CE 997. Independent Study. 2 Credits.

CE 998. Thesis. 1-9 Credits. 
Development and documentation of scholarly activity demonstrating proficiency in Civil Engineering at the master's level. Repeatable to 9 credits. Repeatable to 9 credits.

CE 999. Dissertation. 1-18 Credits. 
PhD student doctoral dissertation. Prerequisite: Admission to the PhD in Civil Engineering Program. Repeatable to 18 credits. S/U grading. F, S, SS.

Undergraduate Courses for Graduate Credit

CE 412. Soil Mechanics. 3 Credits. 
Course topics include principles of soil mechanics including weight-volume relationships, classification, compaction, effective stress, permeability and seepage, consolidation, shear strength, site exploration, introduction to lateral earth pressure, and slope stability. Prerequisite: ENGR 203. F.

CE 414. Foundation Engineering. 3 Credits. 
Soil improvements and ground modifications, soil exploration and sampling, bearing capacity, spread footings, mat foundations, settlement analysis, drilled shaft and pile foundations, foundations on difficult soil. Prerequisite: CE 412. S.

CE 434. Environmental Engineering Laboratory. 4 Credits. 
Physical, chemical and biological methods used in environmental engineering, water chemistry, instrumental methods, lab tours. On demand.

CE 444. Contracts and Specifications. 3 Credits. 
Engineering contracts and specification essentials, legal aspects of engineering practice and employment; professional practice issues; procurement of work; governmental regulation. S.

Combined Degree in Civil Engineering

To encourage undergraduate engineering students to extend their studies to include a graduate degree, the College of Engineering and Mines has a combined program that permits students to earn both a bachelor’s and master’s degree in an engineering discipline. This program allows students to designate two three-credit graduate courses to count for both degrees. The selected courses must have graduate course standing and be designated when a student requests admission to the program.

Students may be admitted to the Civil Engineering Combined Degree program after the completion of 95 credit hours toward the bachelor’s degree with a GPA of at least 3.3 and before completion of the bachelor’s degree. The student is admitted to the School of Graduate Studies’ on completion of 125 credit hours for the bachelor’s degree.

Doctor of Philosophy in Civil Engineering

Admission Requirements

1. A baccalaureate degree in an engineering discipline with a GPA of 3.3 or higher or a Master of Science degree in an engineering discipline with a GPA of 3.0.

2. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the Graduate Catalog.

3. In addition to meeting the general provisions in the UND graduate catalog and the minimum requirements in items 1-2 above, candidates are assessed using a holistic process that considers Student’s Record of Publications, GRE test scores (for students who are applying with a B.S. engineering degree from a non-ABET accredited program), transcripts of previous college work, relevant research and work experience, letters of recommendation, research interests, and English language skills. Students must specify a track on their admission form to facilitate this evaluation.

4. A student holding a non-engineering degree or who does not meet the minimum requirements in items 1-2 above may apply to one of the Master of Science degree programs in the College of Engineering and Mines. Students successfully completing a UND M.S. engineering degree will be
Studies general requirements for the Ph.D. Engineering Doctoral Program. Graduate Studies as well as particular requirements set forth by the Civil Dakota must satisfy all general requirements set forth by the School of Degree Requirements within the seven-year period normally allowed for graduate programs. The consent of the student's adviser. The program of study must be completed accommodate the student's fiscal, family, job related, and other constraints with remainder of the credits required for a degree can be completed in a manner to assistant taking the appropriate credits to qualify as a full-time student. The for at least nine credits in a semester, or be a graduate research or teaching assistant for at least nine credits in a semester, or be a graduate research or teaching assistant taking the appropriate credits to qualify as a full-time student. The remainder of the credits required for a degree can be completed in a manner to accommodate the student’s fiscal, family, job related, and other constraints with the consent of the student’s adviser. The program of study must be completed within the seven-year period normally allowed for graduate programs.

Residence Requirements

The purpose of residence requirements is to provide an opportunity for a sustained and concentrated intellectual effort, to provide for immersion in an academic research environment, and to permit extensive interaction with fellow students and faculty of the Civil Engineering Department. Within the first two years of graduate work at UND, at least two consecutive semesters must be completed in residence. During residency, a student must be registered for at least nine credits in a semester, or be a graduate research or teaching assistant taking the appropriate credits to qualify as a full-time student. The remainder of the credits required for a degree can be completed in a manner to accommodate the student’s fiscal, family, job related, and other constraints with the consent of the student’s adviser. The program of study must be completed within the seven-year period normally allowed for graduate programs.

Under special circumstances, the student in conjunction with his/her advisory committee and the Civil Engineering Graduate Committee, can petition the Dean of the School of Graduate Studies for variances in this policy.

Degree Requirements

Students seeking the Doctor of Philosophy degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Civil Engineering Doctoral Program.

The following requirements are in addition to the UND School of Graduate Studies general requirements for the Ph.D.:

1. Completion of 90 semester credits beyond the baccalaureate degree
2. Maintenance of at least a 3.0 GPA for all classes completed as a graduate student.
3. Scholarly Tools: Proficiency in mathematics demonstrated by completing nine approved credits of mathematics intensive coursework (equivalent to UND 400-level or higher courses) with a grade of B or better which must include at least one course in numerical analysis. Scholarly tools courses taken for graduate credit after a student has enrolled in a graduate program at UND may be counted to fulfill requirements listed in Item 5 below.
4. A maximum of 30 credit hours can be transferred from a master’s program.
5. A minimum of 30 credit hours must be doctoral research and dissertation.
6. Exactly 3 credit hours of the CE 562-Graduate Seminar must be taken.
7. A minimum of 39 credit hours of coursework are required (up to 21 credit hours of coursework may be transferred from a master’s program in fulfilling this requirement subject to the credit transfer limits described in the general section of this graduate catalog). The coursework shall include a minimum of 27 credit hours of Civil Engineering (or relevance courses with the consent of the student’s advisor and advisory committee) coursework selected from the approved list of CE Ph.D. track courses published in the UND Academic Catalog. Equivalent graduate level coursework may be transferred from a master’s program.
8. Successful completion of a qualifying examination, taken no earlier than the end of their first year in residence and no later than the end of their second year of residence. The qualifying examination includes the following three sections.

Section I

A written qualifying examination will cover four general areas of the student’s selected engineering track. Selection of the four general areas for this examination shall require the approval of the candidate’s faculty advisor and the track-specific Ph.D. Graduate Director. Three results for each of the four sections of the examination can be obtained: 1) pass; 2) provisional pass; and 3) fail. Candidates obtaining a result of “provisional pass” for any section of the exam will be required to remediate the topical area in which the provisional pass was received in accordance to stipulations specified by the examiner, with approval of the track-specific Graduate Director. Candidates who fail one or more sections of the exam will be allowed one opportunity to repeat that section of the exam. The reexamination must take place no later than 13 months after the initial examination attempt. A direct admit student who fails an exam a second time may request to be reclassified as a master’s student and complete a track-appropriate Master of Science degree and then reapply to the Doctoral program.

Section II

A detailed written doctoral research proposal must be submitted to the advisory committee. The proposal should cover:

1. a literature review of the relevant field of research related to the project
2. proposed methods
3. preliminary results (simulation or experiment)
4. the objectives of the proposed project, and
5. tasks and the timeline of the proposed research in a Gantt chart.

The proposal should be reviewed and approved by the student advisor. Then, at least three weeks prior to the next step, the proposal should be distributed to the student committee members for their review and grading.

Each of the above (A-E) components will be evaluated and graded (0 to 20). To pass the written proposal exam, student should earn a minimum of 16/20 in each category. All grades from student committee members will be averaged to determine a grade in each category.

If the proposal exam earns a passing grade, a date can be scheduled for an oral comprehensive examination (i.e., Section III). If failed, student has the opportunity to revise and resubmit the report to the committee for re-evaluation.

Section III

An oral comprehensive examination is completed when at least 30 credit hours of post baccalaureate coursework has been completed. The oral comprehensive examination will form a formal presentation by the student to the advisory committee on the research topics described in the above section (II-A to II-E) and will be based significantly on the core of the individual student’s program of study and his/her formal research presentation. Three results for the oral exam can be obtained: 1) pass; 2) provisional pass; and 3) fail. Candidates obtaining a result of “provisional pass” will be allowed to Advance to Candidacy status after completion of stipulations specified by the examining committee plus obtaining a passing result on a retest for the portion of the exam covered by the stipulations. Candidates who fail the exam will be required to remediate the topical area in which the provisional pass was received in accordance to stipulations specified by the examiner, with approval of the track-specific Graduate Director. Candidates who fail one or more sections of the exam will be allowed one opportunity to repeat that section of the exam. The reexamination must take place no later than 13 months after the initial examination attempt as specified by the student committee. A student who fails an exam a second time may request to be reclassified as a master’s student and complete a track-appropriate Master of Science degree and then reapply to the Doctoral program.

1. After successful completion of the written research proposal and oral presentation and examinations, an annual oral progress report should be presented to the advisory committee. A part of these presentations will include details on the dissertation research progress and plan. Any deviation from the approved research objectives as stated and documented in the research proposal must be approved and justified by the committee. CE 562 Graduate Seminar may serve as the venue for the annual oral progress reporting.

2. A candidate for the degree must complete the original basic research investigation as documented in the research proposal. Each candidate will complete the research investigation to the satisfaction of the research advisor and the advisory committee and will prepare a written dissertation covering the research. The project must represent an original and independent investigation by the student. It is expected that the results of the research will be submitted for publication in refereed research journals.
The candidate will submit the dissertation to the examining committee at least four weeks prior to defense date. The examining committee consists of the PhD committee and an external examiner from outside the University. The external examiner is selected by the department’s graduate committee from a list of three candidates proposed by the advisor. The external examiner should not have any common publication with the student’s advisor or student and can be from academia or industry with an expertise relevant to the student’s research. The student and advisor should not contact the external examiner directly before or after.

3. The candidate must present and successfully defend the dissertation at the final examination (see School of Graduate Studies requirements (https://und.edu/academics/graduate-school/)). Four results of the examination can be obtained: 1) pass; 2) minor revision 3) major revision and 4) fail. For minor revisions there is no need for another defense session and upon revising the dissertation the examining committee can pass the student. For major revisions the student is asked to fundamentally revise the methodologies and schedule another defense session. If failed, the student will not be able to obtain a PhD degree and may request to be reclassified as a master’s student and complete a Master of Science degree.

4. At least one peer reviewed journal article (as the first author) and one peer reviewed conference paper (as the first author) must be submitted with the consent of the advisor.

Master of Engineering in Civil Engineering

Admission Requirements

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. Bachelor of Science degree in Civil Engineering from an ABET accredited or equivalent program.
2. Graduate Record Examination General Test for applicants from non-ABET accredited programs.
3. A cumulative Grade Point Average (GPA) of at least 2.5 for all undergraduate work or a GPA of at least 3.0 for the junior and senior years of undergraduate work (based on A = 4.00).
4. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

Degree Requirements

Students seeking the Master of Engineering degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Civil Engineering Department.

1. A minimum of 30 semester credits in a major option, including the credits granted for the design project and the research leading to the design project.
2. At least one-half of the credits must be at or above the 500-level.
3. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.
4. Preparation of a written design project approved by the faculty advisor.
5. Comprehensive final examination.
6. Required Courses:

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<th>Electives</th>
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<tr>
<td><strong>Water Resources Option</strong></td>
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<tr>
<td>CE 523 Applied Hydraulics</td>
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<td>CE 524 Open Channel Hydraulics</td>
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<td>CE 525 Surface Hydrology</td>
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<td>or GEOE 417 Hydrogeology</td>
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<td>CE 595 Design Project</td>
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<th>Electives</th>
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<tr>
<td><strong>General Civil Engineering Option</strong></td>
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<tr>
<td>CE 501 Mechanics of Materials II</td>
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<tr>
<td>CE 523 Applied Hydraulics</td>
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<td>CE 531 Environmental Engineering III</td>
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<td>CE 595 Design Project</td>
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Degree Requirements

Students seeking the Master of Science degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Civil Engineering Department.

Degree requirements will be those listed by the School of Graduate Studies for the M.S. degree, both for the thesis option and the non-thesis option. There are no specific departmental degree requirements beyond those listed in the graduate catalog for the M.S. degree.

Thesis Option:

1. A minimum of 30 semester credits in a major field, including the credits granted for the thesis and the research leading to the thesis.
2. At least one-half of the credits must be at or above the 500-level.
3. A maximum of one-fourth (usually 8-9 semester credits) of the credit hours required for the degree may be transferred from another institution.
4. The program may include just the major, the major and a minor, or the major and a cognate area. The major must include 20 credits from the major department, and a minor or cognate area must include at least nine credits.
5. Preparation of a written thesis approved by the faculty advisory committee (CE 998 Thesis, 4-9 credits).
6. Comprehensive final examination.

Non-Thesis Option:

1. Thirty-two (32) credits including credits required for the major.
2. A minimum of two credits of Independent Study.
3. At least one-half of the credits must be at or above the 500-level.
A special project (UND, NDSU, MiSU): Three-credit Project Course in Cyber Security with a faculty member mentoring.

Curriculum:

Admission Requirements:

1. B.S. or equivalent degree with a GPA of 2.75 or more from an educational institution of recognized standing.
2. At least 12 semester hours or equivalent of coursework in Computer Science, Computer Engineering, Electrical Engineering, Software Engineering, Information Technology, or Information Systems. An acceptable alternative to the coursework background is one or more years of directly related professional experience.

Program Collaborative Graduate Certificate in Cyber Security

Course Descriptions

EE 590 Emerging Threats, and Defenses. Cyber-attacks are a serious economic and Security threat. To combat both immediate and future dangers, businesses and governments are investing in Cyber Security. Understanding trends in computer science and how machine learning and anti-malware defenses can respond to threats is a critical component of protecting networks, infrastructure and users. This course explores the growing challenges of securing sensitive data, networks to defend against malicious acts.

CSCI 693. Foundations of Digital Enterprise. This course is designed to familiarize individuals with current and emerging electronic commerce technologies using the Internet.

CSCI 558. Applied Cryptography. Cryptography is an indispensable tool for protecting information in computer systems. This course explains the inner workings of cryptographic primitives and how to correctly use them. Experience with C or C++ programming is required.

Elective. This is an independent study focusing on a particular Cyber related research topic taken at the individual institution that student may have enrolled. Experiential and applied learning are expected outcomes.

CSCI Courses

CSCI 500. Graduate Orientation. 1 Credit.
A discussion of various research and applied computing projects. Continued enrollment required of all graduate students until a research/project topic and an advisor are selected. S/U grading.

CSCI 501. Topics in Computer Science. 1-3 Credits.
Selected topics from current developments in Computer Science. Repeatable to 3 credits. Prerequisite: Permission of department. Repeatable to 3 credits.

CSCI 513. Advanced Database Systems. 3 Credits.
An advanced study of database system architecture, implementation, and applications, with emphasis on the object-oriented, object-relational, and embedded data models, and new database advancements including research and practical issues in database systems and data science. Prerequisite: CSCI 455.

CSCI 515. Data Engineering and Management. 3 Credits.
This course studies theoretical and applied research issues related to data engineering, management, and science. Topics will reflect state-of-the-art and state-of-the-practice activities in the field. The course focuses on well-defined theoretical results and empirical studies that have potential impact on data acquisition, analysis, indexing, management, mining, retrieval, and storage. Prerequisite: CSCI 513. S, even years.

CSCI 552. Theoretical Foundations of Computer Science. 3 Credits.
A selection of topics from theoretical computer science, possibly including formal languages, automata, other models of computation, and the theory of computability, decidability, and complexity. Prerequisite: CSCI 435.

CSCI 532. High Performance Computing and Paradigms. 3 Credits.
A study of current topics in threads, inter-process communication and synchronization, master-slave and peer designs for concurrency, client-server architectures, cluster/grid computing and massively parallel computer architectures. A considerable amount of programming will be done in one or more of these environments. F, odd years.

CSCI 537. Graduate Cooperative Education. 1-2 Credits.
A practical work experience in advanced computing, approved by the student’s advisor. Requirements include a written report and an oral presentation upon completion of the work experience. Prerequisites: A minimum of 9 graduate credits in computer science and consent of the Department. S/U grading. On demand.

CSCI 543. Machine Learning. 3 Credits.
An introductory course in machine learning for data science. Topics include the learning algorithms of a Bayesian network, neural network, parametric/ non-parametric methods, kernel machine, support-vector machine, etc. for regression, classification, clustering, dimensionality reduction, etc. Prerequisite: CSCI 365 or CSCI 384. F, odd years.
CSCI 544. Soft Computing: Computational Intelligence I. 3 Credits.
A study of the computational intelligence with the Soft Computing paradigm. The topics include the theory and computational methods of Fuzzy Logic and system, Neural Network, Evolutionary Algorithm and other topics, whose paradigms and hybrid techniques are widely applied to data science and mining, pattern classification and clustering, information retrieval, control engineering, decision making, and optimization problem, etc. S, even years.

CSCI 545. Discrete Dynamical Systems Modeling and Simulation. 3 Credits.
A study of various modeling methods applicable to large scale distributed and parallel systems. Topics include cellular automata, grid models, and chaos theory. Prerequisite: CSCI 445.

CSCI 546. Advanced Computer Graphics. 3 Credits.
An introduction to advanced topics in computer graphics. Included are light and color theory, image processing and compression, spatial-frequency transformations, raytracing, sampling theory, and topics of current interest. Prerequisites: CSCI 466 and MATH 265. S, even years.

CSCI 547. Scientific Visualization. 3 Credits.
A study of visualization techniques useful in the analysis of engineering and scientific data. Topics include the study of physical models; methods of computational science; two - and three-dimensional data types; visual representation schemes for scalar, vector, and sensor data; isosurface and volume visualization methods. The course will also cover image processing and pattern recognition, with topics, including Fourier transforms, fractal geometry, and neural networks. Prerequisite: CSCI 466. F, even years.

CSCI 551. Security for Cloud Computing. 3 Credits.
Cloud computing scheme aims to provide users with a shared computing infrastructure. The privacy and security concerns in cloud computing are different from the security concerns present in a dedicated data center. This course focuses on these security concerns and countermensures for a cloud environment. This course provides an overview of cloud computing and virtualization, the critical technology underpinning cloud computing, and the major threats to the operations of cloud computing. Topics may include access control, identity management, denial of service, account and service hijacking, secure APIs, malware, forensics, regulatory compliance, trustworthy computing, and secure computing. Prerequisites: CSCI 370, CSCI 451; and one of the following: CSCI 327, CSCI 427 or CSCI 555. S, odd years.

CSCI 552. Cyber Physical Systems Security. 3 Credits.
This course provides an introduction to security issues relating to various cyber-physical systems including industrial control systems and those considered critical infrastructure systems. Topics include: Industrial cyber security history and threats, hacking industrial control systems, securing industrial control systems, advanced cyber-physical systems security concepts, and privacy in cyber-physical systems. F, even years.

CSCI 554. Applications in AI/Computational Intelligence. 3 Credits.
A continuous study of the computational paradigms of Soft Computing in the field of Computational Intelligence. The topics include the applications of the various soft computing techniques in Computational Intelligence as well as more evolutionary algorithms in Swarm Intelligence. Prerequisite: CSCI 544. F, even years.

CSCI 555. Computer Networks. 3 Credits.
A study of new and developing network architectures and communication protocols. Broadband technologies will be considered including BISDN, ATM networks, and other high-speed networks. Prerequisite: CSCI 327.

CSCI 562. Formal Specification Methods. 3 Credits.
A foundational course that introduces several formal specification techniques for construction and analysis of software artifacts. Included are rigorous program development, abstract specifications of modules, and modeling of concurrent and distributed software. Prerequisites: CSCI 435 and CSCI 463.

CSCI 565. Advanced Software Engineering. 3 Credits.
A study of current topics related to the design and implementation of large software systems. Course content may vary with instructor and student interest. Potential topics include: software testing and validation, programming environments, program metrics and complexity, design methodologies, software reliability and fault tolerance. Prerequisite: CSCI 463.

CSCI 566. Software Engineering Project. 3-6 Credits.
The complete development of a useful software product, including specifications, design, documentation, coding, testing and verification. Students may work in teams. The project is supervised by the students’ Independent Study Advisor. This course may not be used as an elective for the thesis option in computer science. Repeatable to 6 credits. Prerequisite: CSCI 463. Repeatable to 6 credits.

CSCI 575. Analysis of Algorithms. 3 Credits.
The time and space complexity of classical computer algorithms is analyzed. NP hard and NP complete problems are characterized and illustrated. Prerequisite: CSCI 435.

CSCI 582. Software Architecture. 3 Credits.
Software architecture is a fairly young sub-discipline within software engineering; it is aimed at shifting the designer's focus from algorithmic control structure to interactive interrelations among components. This course, among other things, will expose students to the concepts of design, design of design, principles and state-of-the-art methods and techniques in software architectures, which include the discussion of architectural patterns (or styles), domain specific architectural design, formal architectural description languages (ADLs), software connectors (simple and composite), architectural analysis, and middleware and component-based software development. Prerequisites: CSCI 463 and CSCI 435.

CSCI 588. Data Structure, Algorithms, and Software Design in C++. 3 Credits.
This course is intended for the Scientific Computing Ph.D students. The course attempts to introduce C++ via laboratory sessions. More specifically, this course tries to incorporate Data Structures and Algorithms in C++ as well as Software Design in C++. During these sessions the students are introduced to C++ concepts using a series of examples. Having examined the examples given in the session and having understood the concepts covered, the student should be able to complete open-ended problems. This course assumes no prior knowledge of C++.

CSCI 591. Directed Studies. 1-3 Credits.
An investigation of some specific area by an individual or small group of students working closely with a member of the graduate faculty. 1-3 credits in each graduate degree program. Prerequisites: Graduate standing and consent of instructor. Repeatable to 6 credits. F,S,SS.

CSCI 599. Research. 1-6 Credits.
This course is intended for Ph.D students to obtain credit for their research efforts. Repeatable to 21 credits. Repeatable to 21 credits. S/U grading.

CSCI 996. Continuing Enrollment. 1-12 Credits.

CSCI 997. Independent Study. 2 Credits.
Independent Study.

CSCI 998. Thesis. 1-9 Credits.
Thesis. Repeatable to 9 credits.

CSCI 999. Dissertation. 1-12 Credits.
Dissertation. Repeatable to 12 credits. F,S,SS.

Undergraduate Courses for Graduate Credit

CSCI 427. Cloud Computing. 3 Credits.
This is the undergraduate-level course on cloud computing models, techniques, and architectures. Cloud computing is an important computing model which enables information, software, and other shared resources to be provisioned over the network as services in an on-demand manner. This course introduces the current practices in cloud computing. Topics may include distributed computing models and technologies, Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS), Software-as-a-Service (SaaS), virtualization, performance and systems issues, capacity planning, disaster recovery, Cloud OS, federated clouds, challenges in implementing clouds, data centers, hypervisor CPU and memory management, and cloud hosted applications. S, even years.

CSCI 435. Formal Languages and Automata. 3 Credits.
A study of automata, grammars, and Turing machines as specifications for formal languages. Computation is defined in terms of deciding properties of formal languages, and the fundamental results of computability and decidability are derived. Prerequisites: CSCI 242 with a grade of C or better and minimum second semester junior standing. F.
CSCI 445. Mathematical Modeling and Simulation. 3 Credits.
A study of various mathematical applications for digital computers, including the modeling, simulation and interpretation of the solution of complex systems. Prerequisites: CSCI 161 or CSCI 170, and MATH 166 and a statistics course. F, even years.

CSCI 446. Computer Graphics I. 3 Credits.
Introduction to computer graphics. Topics include raster scan graphics, 2D and 3D representations, affine transformations, light and color, texture mapping, image processing, ray-tracing, and computer animation. Team-based weekly homework develops a 4 minute computer animation. Prerequisites: CSCI 242, CSCI 363, and MATH 166. F, odd years.

CSCI 448. Computer Graphics II. 3 Credits.
A continuation of CSCI 446. Topics covered include: history of games, game taxonomies, game design theory, computer game development, physics engines and AI engines. Prerequisite: CSCI 446. S, even years.

CSCI 451. Operating Systems I. 3 Credits.
Introduction to operating system theory and fundamentals. Topics include: CPU scheduling, memory management, file systems, interprocess communication facilities, security. Weekly homework assignments focus on process synchronization using fork/exe, threads, mutexes, pipes, semaphores, and shared memory. Prerequisites: CSCI 242 and CSCI 370; both with a grade of C or better. F.

CSCI 452. Operating Systems II. 3 Credits.
A study of the implementation of operating systems and parts of operating systems, and development of system software. Prerequisites: CSCI 451. On demand.

CSCI 455. Database Management Systems. 3 Credits.
Database concepts, database design (ER, UML), database programming languages (SQL), NoSQL Database, Database Concurrency and recovery techniques, and Database security. Prerequisite: CSCI 242 with a grade of C or better. S, even years.

CSCI 457. Electronic Commerce Systems. 3 Credits.
A study of the system architecture, content design and implementation, and data analysis, management, and processing of electronic commerce. Topics include Internet basics, business issues, data management and processing, static and dynamic web programming, e-commerce content design and construction, and databases and host languages with embedded SQL. Prerequisite: CSCI 260 with course topic of Dot Net. S, odd years.

CSCI 463. Software Engineering. 3 Credits.
This course teaches software engineering principles and techniques used in the specification, design, implementation, verification and maintenance of large-scale software systems. Major software development methodologies are reviewed. As development team members, students participate in a group project involving the production or revision of a complex software product. Prerequisites: CSCI 242 and CSCI 363. S.

CSCI 465. Principles of Translation. 3 Credits.
Techniques for automatic translation of high-level languages to executable code. Prerequisites: CSCI 365 and CSCI 370. F, odd years.

CSCI 491. Seminars in Computer Science. 1 Credit.
A course for advanced students. Repeatable to 3 credits. Prerequisite: Consent of instructor. Repeatable to 3 credits. S/U grading. F.S.

EE Courses

EE 503. Statistical Communications Theory and Signal Processing I. 3 Credits.
Theory of time series analysis of random signals as applied to signal processing is emphasized. Prerequisite: EE 411 or consent of instructor.

EE 504. Statistical Communications Theory and Signal Processing II. 3 Credits.
Advanced methods of signal detection including linear parameter estimation and non-linear estimation of parameters. Detection of signals and estimation of signal parameters from a probability point of view will be emphasized.

EE 505. Control Systems II. 3 Credits.
Advanced topics in control systems including nonlinear systems, robust control, optimal control, and pole placement techniques; selective topics from the state of the art. Prerequisite: EE 405.

EE 506. Digital Control Systems. 3 Credits.
Digital systems representation, analysis and simulation; Z-transform; digital controllers design and realization; microprocessor based controllers. Prerequisite: EE 405.

EE 507. Spacecraft Systems Engineering. 3 Credits.
Space environment, dynamics of spacecraft, celestial mechanics, mission planning, and systems engineering methodology.

EE 508. Intelligent Decision Systems. 3 Credits.
Systems and networks will be designed to work in an uncertain environment. Systems will be optimized using Neural Networks and Fuzzy Logic concepts. Prerequisite: EE 314 or consent of instructor.

EE 509. Signal Integrity. 3 Credits.
Fundamental concepts of signal integrity are presented. Topics include propagation of digital signals, electrical noise, and system timing. Prerequisite: EE 409 or consent of instructor.

EE 511. Power Electronics. 3 Credits.
Principles of power electronics switching control circuits. Including AC/DC, DC/DC, DC/AC converters, their harmonics and filtering techniques, and their application in switching power supplies, electric drives, renewable energy systems, etc. Prerequisite: EE 321 or consent of instructor. On demand.

EE 512. Wireless Communications. 3 Credits.
Key concepts, underlying principles, and practical applications of ever-growing wireless and cellular communication technologies. Prerequisite: EE 411 or consent of instructor.

EE 519. Digital Computer Logic. 3 Credits.
Logic design analysis of digital computers with some applications. Prerequisite: EE 451 or consent of instructor.

EE 520. Electronic Computing Systems. 3 Credits.
Design of bit slice computers; simulation of computers' special purpose controller design; advanced microprocessor design and use. Prerequisite: EE 201 and EE 421.

EE 521. Digital Signal Processing. 3 Credits.
Modern methods of digital signal processing will be studied. Techniques that will be used include the recursive and nonrecursive discrete-time filters and the Fourier Transform. Prerequisite: EE 314.

EE 522. Renewable Energy Systems. 3 Credits.
This course will provide engineering students with an understanding of the principles of renewable energy conversion systems. Emphasis is on wind, photo-voltaic, hydrogen fuel, and fuel cell energy conversion and storage systems, along with their associated design and control issues.

EE 523. Power Systems II. 3 Credits.
Electric power systems analysis and control. Power flow; system response and stability; voltage and frequency control; computer methods in system analysis. Prerequisite: EE 423.

EE 524. Application Specific Integrated Circuit (ASIC) Design. 3 Credits.
To gain an historic perspective of ASIC Design. To familiarize students with the existing IC technology and their attributes. To recognize basic fabrication process, layout, circuit extraction and performance analysis. To understand CAD tools, hardware, systems engineering, and operational issues. Prerequisite: EE 421 or consent of instructor.

EE 525. Electromagnetic Fields. 3 Credits.
Static electric and magnetic fields, field mapping, and applications to transmission lines, wave-guides, and antennas. Prerequisite: EE 316.

EE 526. Engineering Systems Reliability. 3 Credits.
This course teaches the basics of reliability engineering concepts and techniques applicable to all engineering disciplines including electrical, mechanical, chemical, geological, aeronautical, and civil. To benefit the most from this course, some basic knowledge of probability and statistics would be helpful but is not necessary as the required background and tools are presented and discussed in the class. Prerequisite: Consent of the instructor. On demand.

EE 530. Phased Array Antennas. 3 Credits.
Basic antenna and array characteristics, pattern synthesis techniques, analysis and design of radiating elements and feed networks, mutual coupling and array error analysis, adaptive arrays. Prerequisite: Consent of instructor. On demand.

EE 532. Antenna Theory. 3 Credits.
Physical principles underlying antenna behavior and design as applied to antennas. Prerequisite: EE 316 or consent of instructor.
EE 534. Advanced Wireless Communications Engineering. 3 Credits.
A combination of theory and practice underlying principles and practical applications of Wireless Communications. Prerequisite: Consent of Instructor. On demand.

EE 536. Optical Fiber Communications. 3 Credits.
Propagation in optical fibers, optical receivers, amplifiers, detectors, sources, transmission links, noise consideration, optical fiber communication systems, applications and future developments. Prerequisite: EE 434 or consent of instructor.

EE 537. Graduate Cooperative Education. 1-2 Credits.
The is course is a practical research experience under supervision of an employer that is closely associated with the student's academic area. A written report which includes a literature survey and research findings and an oral presentation are required. Prerequisite: Approval of the Electrical Engineering Graduate Committee or Electrical Engineering Department Graduate Director, completion of the program of study. Repeatable to 3 credits. S/U grading.

EE 539. Electromagnetic Compatibility. 3 Credits.
Introduction to design considerations and techniques used to ensure electromagnetic compatibility. Prerequisite: EE 409 or consent of instructor.

EE 540. Computer Networks Communications. 3 Credits.
Computer Communications is an undergraduate/graduate course that introduces fundamental concepts in the design and implementation of computer communication networks and their protocols. Prerequisite: Consent of the instructor. On demand.

EE 542. Network Architectures. 3 Credits.
Several network architectures are used today for transporting data and providing a good network service and performance. This course explains the fundamental network architecture concepts and their communications protocols. Prerequisite: Consent of the instructor. On demand.

EE 544. Advanced Microwave Engineering. 3 Credits.
Analysis of passive microwave components including power dividers, resonators, filters, ferromagnetic and MEMs components. On demand. Prerequisites: EE 409 and EE 434, or consent of instructor. On demand.

EE 545. Introduction to Biomedical Engineering. 3 Credits.
This course introduces biomedical engineering and several systems of the human physiology. Signals of biological origin obtained from these systems, biosensors, transducers and bioelectrodes used to acquire such signals, along with medical quality amplifiers for measuring bipotentials, are discussed. Prerequisite: EE 314, EE 421 or consent of instructor.

EE 546. Biomedical Signal Processing. 3 Credits.
This course presents the several fundamental of digital signal processing methods applied to biomedical signals. Topics include data acquisition and related issues, teiring, feature extraction, classification, and decision making. The course is based on a series of labs and experiments of applying different methods to real biomedical signals. Lectures cover signal processing topics relevant to the lab exercises. Prerequisite: Consent of the instructor. On demand.

EE 547. Deep Learning Applications in Biomedical Engineering. 3 Credits.
Applications of different machine learning techniques to biomedical image and signal processing are evaluated. Prerequisite: EE 314 or the consent of the instructor. On demand.

EE 550. Biomedical Instrumentation. 3 Credits.
Introduction to circuits and systems that allow electrical technology to interface with biological systems. Prerequisite: EE 314, EE 316 and EE 421, or consent of instructor.

EE 551. Cryptography Techniques and their VLSI Implementations. 3 Credits.
Modern cryptography algorithms are necessary for protecting data storage and communication streams from disclosure and manipulation of information by hackers. This course exposes students to the standard cryptography algorithms and their implementation in VLSI chips, Field Programmable Array devices, using VHDL language. Prerequisite: Consent of the instructor. On demand.

EE 552. Advanced Embedded Systems Design. 3 Credits.
This course provides students with cutting-edge techniques in the design and implementation of advanced embedded systems that involve analog/digital conversion, interrupts, timers, CCP modules, and parallel/serial communications. Prerequisite: EE 452 or consent of instructor.

EE 556. Engineering Computation. 3 Credits.
Development and application of optimization techniques in practical problems encountered in electrical engineering, Downhill and probabilistic optimization techniques, Modeling of complex systems by partial differential equations and their numerical solution by finite difference and finite element methods. Prerequisite: Consent of instructor. On demand.

EE 557. Seminar. 1 Credit.
The purpose of the course is to practice communication skills in writing papers and preparing presentations. Open to qualified advanced undergraduate students and graduates. Repeatable to 3 credits. On demand.

EE 560. Advanced Linear Programming Modeling. 3 Credits.
This course will focus on the solution of large-scale linear optimization problems and systems of linear inequalities. Theoretical topics to be addressed include some fundamental results from convex analysis applied to linear programs, and basic ideas from complexity theory especially the importance of polynomial-time algorithms. Algorithmic topics include extensions to the simplex method, the primal-dual simplex method, interior point algorithms, and decomposition and column-and row-generation methods and Mixed integer programming and network flow topics. Prerequisite: EE 304 or consent of the instructor. On demand.

EE 565. Electromagnetic Compatibility. 3 Credits.
Introduction to design considerations and techniques used to ensure electromagnetic compatibility. Prerequisite: EE 409 or consent of instructor. On demand.

EE 590. Advanced Electrical Engineering Problems. 1-6 Credits.
Credit hours for new graduate courses and special topics in Electrical Engineering. Prerequisites: Open by permission to graduate students and qualified seniors. Repeatable. On demand.

EE 591. Electrical Engineering Research. 1-6 Credits.
Students perform a project under the supervision of a member of the staff. A written report is required. Repeatable for credit. Prerequisites: Admission to one of Electrical Engineering graduate programs and consent of instructor. Repeatable to 9 credits. On demand.

EE 595. Design Project. 3-6 Credits.
A three to six credit course of engineering design experience involving individual effort and a formal written report. Repeatable to 6 credits. Prerequisites: Restricted to Master of Engineering student candidates and subject to approval by the student's advisor. Repeatable to 6 credits.

EE 599. Doctoral Research in Electrical Engineering. 1-15 Credits.
Doctoral Reserach. Repeatable. F,S,SS.

EE 601. Foundations of Cyber Security. 3 Credits.
This course provides a solid foundation for further study in cyber security. The course incorporates numerous topics that are fundamental to the field beginning with a high-level overview of cyber security and continuing into the topics of calculus and computer programming. These topics are presented utilizing real-world cyber security applications. Prerequisite: Students enrolled/admitted in the MS in Cyber Security program. F,S,SS.

EE 611. Emerging Threats and Defenses. 3 Credits.
Cyber-attacks are a serious economic and security threat. To combat both immediate and future threats, businesses and governments are investing in cyber security. Understanding trends in cyber-security and how machine-learning techniques defenses can respond to threats is a critical component of protecting networks, infrastructure and users. This course explores the growing challenges of securing sensitive data, networks to defend against malicious acts. Prerequisite: Consent of the instructor. On demand.

EE 612. Spread Spectrum Communications for Cyber Security. 3 Credits.
This course brings students up-to-date in key concept, underlying principles and practical applications of Spread Spectrum Technology. A course that presents timely information that student can immediately put to use in tackling real world cyber threats. Prerequisite: Consent of the instructor. On demand.

EE 613. Advanced Cyber Security Principles. 3 Credits.
This course is a comprehensive study of the principles and practices of computer system security including operating system security, network security, software security and web security. Topics include common attacking techniques such as virus, trojan, worms and memory exploits; the formalisms of information security such as the access control and information flow theory; the common security policies such as BLP and Biba model; the basic cryptography, RSA, cryptographic hash function, and password system; the real system implementations, with case study of UNIX, SE-Linux, and Windows; network intrusion detection; software security theory; web security; legal and ethical issues in computer security. Prerequisite: Consent of the instructor. On demand.
EE 614. Applied Cryptography. 3 Credits.
Modern cryptography algorithms are necessary for protection of data storage and communication streams from disclosure and manipulation of information to distrusted or malicious parties. This course explains the inner workings of cryptographic primitives and how to implement them. Assignments will be both theoretical and application based. Experience with C/ C++ programming is required. Prerequisite: Consent of the instructor. On demand.

EE 615. Cyber Forecasting. 3 Credits.
There are literally millions of enterprises and organizations that already conduct business on the World Wide Web and millions more that will in the future. Many are not sure on how much to spend to defend themselves against Internet Security attacks and many are afraid to conduct business on the Web because of the lack of security in their infrastructure and information systems. Prerequisite: Consent of the instructor. On demand.

EE 616. Cyber-Physical Energy Systems Security. 3 Credits.
This course discusses the basics of integrated power and communication infrastructures in cyber-physical electrical energy and power systems. In order to understand planning, design and operation of such systems, this course includes both cyber and physical topics related to modern power systems, such as technologies for storing and generating electric power (including renewable energy), layering, networking, packets routing, coding, cellular networks, WLAN, and sensors. Approaches for an integrated operation, management and control of such systems, as well as the application of signal processing techniques in electric power grids are also explored in this course. Implication of such integrated power and communications cyber-physical systems in terms of sustainability, security, resiliency, and reliability will also be reviewed. Prerequisites: EE 313 and EE 423 or consent of the instructor. On demand.

EE 617. Data Operations and Security. 3 Credits.
This course explains the key concepts used in database systems and demonstrates the features of a Database management software. The course will discuss the different types of commercial database systems and will explain the concepts used to design a database. Also this course will teach how to implement a database using the relational DBMS. The course also illustrates the usage of database management systems. The course will also discuss database attacks, ACID properties. Prerequisite: Consent of the instructor. On demand.

EE 623. Introduction to Smart Grid I. 3 Credits.
This course is an in-depth study of the ways in which information and communication technologies (ICT) are being deployed to modernize the electric energy infrastructure, i.e. "Smart Grid." In this course we will delve Smart Grid as the use of ICT (in combination with power electronics and policy) to make electricity cleaner, less costly, and more reliable. Prerequisite: EE 313 or graduate student standing. On demand.

EE 624. Introduction to Smart Grid II. 3 Credits.
This is the next sequence of smartgrid course is an in-depth study of the ways in which information and communication technologies (ICT) are being deployed to modernize the electric energy infrastructure, i.e. "Smart Grid." In this course we will delve Smart Grid as the use of ICT (in combination with power electronics and policy) to make electricity cleaner, less costly, and more reliable. Prerequisite: EE 623. On demand.

EE 640. Communication Protocols: OSI model and TCP/IP Protocol Stack. 3 Credits.
Communication between computers and networks uses protocols. This course introduces students to the OSI model and TCP/IP protocol stack. Functions of each layer in the network are explained and their security analyzed. Prerequisite: Consent of the instructor. On demand.

EE 740. Intrusion Detection Algorithms. 3 Credits.
With the increasing number of cyber-attacks, intrusion detection systems become crucial tools for detecting anomalies and enhancing computers and networks security. This course exposes students to the existing intrusion detection techniques and algorithms, including signature-based and anomaly-based approaches. Prerequisite: Consent of the instructor. On demand.

EE 748. Internet of Things. 3 Credits.
The Internet of Things course will examine the security and ethical issues of the vast implementation of smart devices known as the Internet of Things (IoT). The IoT is an environment where smart devices sense, anticipate, and respond to our needs as we manage them remotely. These smart devices often act as the gateway between our digital and physical world. The IoT touches many aspects of life including transportation, health care, safety, environment, energy, and more. This course will examine and discuss IoT technologies and applications. Prerequisite: Consent of the instructor. On demand.

EE 750. Internet of Things and Security. 3 Credits.
Internet of Things (IoT) is an emerging field where computing devices are interconnected through the existing internet infrastructure. The IoT has changed the world with new innovative products such as autonomous vehicles, smart home, and smart wearables devices. This course explains the concept of IoT, its applications, networks and communication architectures, and security threats. Prerequisite: Consent of the instructor. On demand.

EE 751. Wireless Sensor Networks. 3 Credits.
This class provides a hands-on introduction to wireless sensor networking. We will start with a discussion of the WSN+ubiquitous computing vision and applications, and also discuss emergent/swarm behavior in distributed and networked systems. We will provide a tutorial on programming wireless sensor network applications in Tinyos. Finally, we will quickly cover protocols for MAC layer, Localization, Routing, Querying, and Tracking. Prerequisite: Consent of the instructor. On demand.

EE 752. Introduction to Autonomous Systems. 3 Credits.
Advanced topics in autonomous and intelligent mobile robots, with emphasis on planning algorithms and cooperative control. Robot kinematics, path and motion planning, formation strategies, cooperative rules and behaviors. The application of cooperative control spans from natural phenomena of groupings such as fish schools, bird flocks, deer herds, to engineering systems such as mobile sensing networks, vehicle platoon. Prerequisite: Consent of the instructor. On demand.

EE 994. Capstone. 3 Credits.
This course is intended for students enrolled in a graduate program, who need to complete a semester long project. The class will emphasize applied learning to demonstrate real world problem solving skills. F,S,SS.

EE 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

EE 997. Independent Study. 3 Credits.
This course is independent study for MS Non-Thesis Students. Prerequisite: Consent of Advisor.

EE 998. Thesis. 1-6 Credits.
Repeatable to 9 credits.

EE 999. Dissertation in Electrical Engineering. 1-18 Credits.
Dissertation for Ph.D. EE students. Repeatable to 18 credits. F,S,SS.
EE 434. Microwave Engineering. 3 Credits.
Review of transmission lines and plane waves, analysis of microwave networks and components using scattering matrices, analysis of periodic structures, transmission and cavity type filters, high frequency effects, microwave oscillators, amplifiers, and microwave measurement techniques. Prerequisite: EE 409 or consent of instructor. On demand.

EE 451. Computer Hardware Organization. 3 Credits.
The study of complete computer systems including digital hardware interconnection and organization and various operation and control methods necessary for realizing digital computers and analog systems. Prerequisite: EE 201 and EE 304; or consent of instructor. On demand.

EE 456. Digital Image Processing. 3 Credits.
Digital image retrieval, modification, enhancement, restoration, and storage. Image transformation and computer vision. The associated laboratory provides hands-on experiences. Prerequisite: EE 304 and EE 314. On demand.

Combined B.S./M.S. or B.S./M.Eng. Degrees in Electrical Engineering

Admission Requirements for B.S./M.S. or B.S./M.Eng. Degree
1. Students may apply for this program upon completion of 95 credits toward the bachelor’s degree.
2. An overall undergraduate GPA of 3.0 at the time of admission.
3. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.
4. Students who have received a bachelor’s degree or higher from the United States or English-speaking Canada are not required to submit the TOEFL.

Degree Requirements for B.S./M.S. or B.S./M.Eng. Degree

Students seeking the Master of Science or Master of Engineering degree through the Combined Degree program at the University of North Dakota must satisfy all requirements for both the B.S. and M.S. degree. A maximum of six credits of prior approved coursework can get double counted toward each of the two degrees. Double counted courses may not include required courses for the B.S.E.E. degree, but may include technical or electrical engineering elective coursework, preferably at the 500-level or above.

Degree requirements for the M.S. or M.Eng. degree will be those listed by the School of Graduate Studies as found in the graduate school catalog.

Doctor of Philosophy in Electrical Engineering

Admission Requirements
1. A baccalaureate degree in Electrical or closely related engineering disciplines with a GPA of 3.3 or higher or a Master of Science degree in an engineering discipline with a GPA of 3.0.
2. Satisfy the Graduate School’s English Language Proficiency requirements as published in the Academic Catalog.
3. In addition to meeting the general provisions in the UND Academic Catalog and the minimum requirements in items 1-2 above, candidates are assessed using a holistic process that considers Student’s Record of Publications, transcripts of previous college work, relevant research and work experience, letters of recommendation, research interests, and English language skills. Applicant applying with BS degrees from non-ABET accredited programs/universities are strongly recommended to submit scores from the General Test of Graduate Record Examination.
4. Students admitted to an M.S.E.E. program but meeting the minimum requirements in items 1-2 above, may after one calendar year, and upon the recommendation of his/her advisory committee, request to by-pass the master’s degree and work directly toward the Ph.D. degree in Electrical Engineering. The recommendation of the advisory committee shall be brought to a vote by the Electrical Engineering graduate committee. A minimum of one week before such a meeting, the graduate committee shall be notified and provided with the student’s updated file which shall consist of the materials used for application into the M.S.E.E. program, a transcript of all academic work completed at UND, and any additional materials the student wishes to have considered. If the recommendation is approved by the relevant graduate committee, the student will be given the qualifying exam. Passing this exam will advance the student to Approved Status in the Doctoral Program in Electrical Engineering.

Residence Requirements

The Ph.D. program in Electrical Engineering provides an opportunity for sustained and concentrated intellectual efforts. In both campus and distance delivery modes, the Electrical Engineering faculty advisor and advisory committee members must maintain regular interactions with Ph.D. student. For campus delivery mode, the student is required to have residency of at least two consecutive semesters. During residency, the student must be registered for at least nine credits in a semester, or be a graduate research or teaching assistant taking the appropriate credits to qualify as a full-time student. As an alternative, students utilizing the distance delivery program can meet the residency requirement by demonstrating their research activities are coordinated with their advisor and advisory committee and are being performed in an environment that provides meaningful intellectual interactions on a regular basis. This may be provided through their place of employment, through interactions with a national lab or other recognized research facility/university, by interfacing with a private of public industry, hospital, or other similar venue. The student will be responsible for including the nature of their interactions as a part of their research plan for approval as meeting residency requirements. For distance delivery mode, the student must have a minimum three campus visits and provide a presentation during each visit. One of these presentations can be the oral section (Section III) of the qualifying examination. Additionally, a Ph.D. candidate must be physically present on campus for the Ph.D. dissertation defense.

Degree Requirements

Students seeking the Doctor of Philosophy degree at the University of North Dakota must satisfy all general requirements set forth by the Graduate School as well as particular requirements set forth by the Electrical Engineering Doctoral Program.

The following requirements are in addition to the UND graduate school general requirements for the Ph.D.:

1. Completion of 90 semester credits beyond the baccalaureate degree.
2. Maintenance of at least a 3.0 GPA for all classes completed as a graduate student.
3. Scholarly Tools: Proficiency in mathematics demonstrated by completing nine approved credits of mathematics intensive coursework (equivalent to UND 400-level or higher courses) with a grade of B or better which must include at least one course in numerical analysis. Scholarly tools courses taken for graduate credit after a student has enrolled in a graduate program at UND may be counted to fulfill requirements listed in Item 4 below.
4. A maximum of 30 credit hours can be transferred from a master’s program.
5. A minimum of 30 credit hours must be doctoral research and dissertation.
6. Exactly 3 credit hours of the EE 570-Graduate Seminar must be taken.
7. Maximum of 9 credit hours of EE 591 Electrical Engineering Research is acceptable.
8. A minimum of 39 credit hours of coursework is required (up to 21 credit hours of coursework may be transferred from a master’s program in fulfilling this requirement subject to the credit transfer limits described in the general section of this Academic Catalog). The coursework shall include a minimum of 27 credit hours of Electrical Engineering (or relevance courses with the consent of adviser) coursework selected from the approved list of
courses. Equivalent graduate level coursework may be transferred from a master’s program.

9. Successful completion of a qualifying examination, taken no earlier than the end of their first year in residence and no later than the end of their second year of residence. The qualifying examination includes the following three sections.

Section I
It will cover four general topics of Electrical Engineering. Selection of the four topics for this examination shall require the approval of the candidate’s faculty advisor and the Graduate Director. Three results for each of the four sections of the examination can be obtained: 1) pass; 2) provisional pass; and 3) fail. Candidates obtaining a result of “provisional pass” for any section of the exam will be required to remediate the topical area in which the provisional pass was received in accordance to stipulations specified by the examiner, with approval of the Graduate Director. Candidates who fail one or more sections of the exam will be allowed one opportunity to repeat that section of the exam. The reexamination will take place no later than 13 months after the initial examination attempt. A direct admit student who fails an exam a second time may request to be reclassified as a master’s student and complete a M.S.E.E. or M.Eng. in EE, and then reapply to the Doctoral program.

Section II
A detailed written doctoral research proposal must be submitted to the committee. The proposal should cover:

a. a literature review of the relevant field of research related to the project
b. proposed methods
c. preliminary results (simulation or experiment)
d. the objectives of the proposed project, and
e. tasks and the timeline of the proposed research.

The report is typically 30-50 pages. The report should be reviewed and approved by the student advisor. Then, at least three weeks prior to the next step, the report should be distributed to the student committee members for their review and grading.

Each of the five (a-e) components will be evaluated and graded on scale of 0 to 20. To pass the written exam, the student should earn a minimum of 16/20 in each category. All grades from student committee members will be averaged to determine a grade in each category.

If the report earns a passing grade, a date can be scheduled for an oral presentation (i.e., Section III). If failed, the student has the opportunity to revise and resubmit the report to the committee for re-evaluation.

Section III
An oral component of the comprehensive examination must be presented in person to the committee on the research topics described in the above section (II-a to II-e). Three results for the oral component can be obtained: 1) pass; 2) provisional pass; and 3) fail. Candidates obtaining a result of “provisional pass” will be allowed to Advance to Candidacy status after completion of stipulations specified by the examining committee plus obtaining a passing result on a retest for the portion of the exam covered by the stipulations. Candidates who fail the exam will be allowed one opportunity to repeat the exam in less than 6 months as specified by the student committee. A student who fails an exam a second time may request to be reclassified as a master’s student and complete a Master of Science in Electrical Engineering degree and then reapply to the Doctoral program.

10. Annual oral progress presentations and report forms must be presented submitted to the committee. A part of these presentations will include the dissertation research progress and plan. After successful completion of the written research proposal and oral component of comprehensive exam, any deviation from the approved research objectives as stated and documented in the research proposal must be approved by the committee.

11. A candidate for the degree must complete the original basic research investigation as documented in the research proposal. Each candidate will complete the research investigation to the satisfaction of the research advisor and the advisory committee and will prepare a written dissertation covering the research. The research must represent an original and independent investigation by the student. It is expected that the results of the research will be submitted for publication in refereed research journals and conferences. The candidate will submit the dissertation to the advisory committee at least four weeks prior to defense date.

12. The candidate must present and successfully defend the dissertation at the final examination (see School of Graduate Studies requirements (https://und.edu/academics/graduate-school)). Four results of the examination can be obtained: 1) pass; 2) minor revision; 3) major revision; and 4) fail. For minor revisions there is no need for another defense session, and, upon revising the dissertation, the advisory committee can pass the student. For major revisions the student is asked to fundamentally revise the methodologies and schedule another defense session. If failed, the student will not be able to obtain a Ph.D. degree and may request to be reclassified as a master’s student and complete a Master of Science in Electrical Engineering degree.

13. At least two peer reviewed ISI (Institute for Scientific Information) journals (as the first author) and two peer reviewed conference papers (as the first author), submitted with the consent of advisor, must be published or accepted.

Master of Engineering in Electrical Engineering

Admission Requirements

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. Bachelor of Science degree in Electrical Engineering or closely related field. Students holding B.S. degrees in other fields, e.g., physics, mathematics, and computer science, may be admitted to Provisional or Qualified status until undergraduate requirements in electrical engineering have been satisfied.
2. An overall undergraduate GPA of at least 2.5 or a GPA of at least 2.75 for the last two years.
3. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

Degree Requirements

1. A program of study must include the following:
   a. A minimum of 30 semester credit hours
   b. Three to Six (3-6) semester credit hours of an approved design project (EE 595 Design Project)
   c. Maximum of three (3) credit hours of EE 591 Electrical Engineering Research is acceptable.
   d. Minimum of fifteen (15) semester credit hours of coursework at the 500 level or above (including the design project)
   e. All courses must be approved for graduate credit and by the advisor.
2. An overall GPA of 3.0 or better for all coursework.

Master of Science in Cyber Security

This program (https://onlinedegrees.und.edu/ipap-mscs/?Access_Code=UND-MSCS-SEO2&utm_campaign=UND-MSCS-SEO2) prepares students who have a strong interest related to the field of cyber security. All of the general requirements for enrollment, participation, and completion of a degree documented in the catalog of the University of North Dakota as appropriate shall be required. Specific requirements over and above the general catalog requirements are as follows:
Admission Requirements

1. A bachelor’s degree, graduate degree or equivalent from an accredited institution.

2. A minimum G.P.A. of 2.75 (4.0 scale) is required. Provisional admittance may be obtained for G.P.A.s less than 2.75. This will be determined on a case-by-case basis.

Students will have the option to choose an all course based M.S. program (30 credits) or an M.S. program with a thesis component, in which 6 credits out of the 30 credits will be thesis.

Degree Requirements (30 Credits)

Non-thesis

1. Selected Required courses (18 credits required for all students)
   - EE 601 Foundations of Cyber Security 3
   - EE 611 Emerging Threats and Defenses 3
   - EE 614 Applied Cryptography 3
   - EE 640 Communication Protocols: OSI model and TCP/IP Protocol Stack 3
   - CSCI 565 Advanced Software Engineering 3
   - EE 994 Capstone 3

2. Tracks: Requirements in addition to the Required Courses in #1
   - A. General
     Required Track courses: Any 12 credits from the program course list.
   - B. Autonomous Systems Cyber Security
     - EE 552 Advanced Embedded Systems Design 3
     - EE 752 Introduction to Autonomous Systems 3
     - EE 526 Engineering Systems Reliability 3
     Electives: 3 credits from the program course list*
   - C. Data Security
     - CSCI 427 Cloud Computing 3
     - EE 740 Intrusion Detection Algorithms 3
     - CSCI 455 Database Management Systems 3
     Electives: 3 credits from the program course list*
   - D. Cyber Security and Behavior
     - PSYC 522 Human Factors in Cyber Security 3
     - PSYC 525 Insider Threat Analysis 3
     - PSYC 539 Cognitive Psychology 3
     Electives: 3 credits from the program course list*

3. Free Electives
   - EE 623 Introduction to Smart Grid I 3
   - EE 750 Internet of Things and Security 3
   - EE 537 Graduate Cooperative Education 3
   *Any “Track” course outside of one’s selected track can count as an elective

Program Course List:

- EE 526 Engineering Systems Reliability 3
- EE 552 Advanced Embedded Systems Design 3
- EE 611 Emerging Threats and Defenses 3
- EE 614 Applied Cryptography 3
- EE 623 Introduction to Smart Grid I 3
- EE 640 Communication Protocols: OSI model and TCP/IP Protocol Stack 3
- EE 740 Intrusion Detection Algorithms 3
- EE 752 Introduction to Autonomous Systems 3
- EE 750 Internet of Things and Security 3
- CSCI 427 Cloud Computing 3
- CSCI 513 Advanced Database Systems 3
- CSCI 565 Advanced Software Engineering 3
- PSYC 522 Human Factors in Cyber Security 3
- PSYC 525 Insider Threat Analysis 3

Thesis

Required: (30 credits from the following list, with advisor consent, 6 credits will be thesis). Graduate Cooperative Education (EE 357) must be cyber security based industrial or external research lab.

- EE 611 Emerging Threats and Defenses 3
- EE 612 Spread Spectrum Communications for Cyber Security 3
- EE 616 Cyber-Physical Energy Systems Security 3
- EE 551 Cryptography Techniques and their VLSI Implementations 3
- EE 623 Introduction to Smart Grid I 3
- EE 624 Introduction to Smart Grid II 3
- EE 526 Engineering Systems Reliability 3
- EE 552 Advanced Embedded Systems Design 3
- EE 540 Computer Networks Communications 3
- EE 534 Advanced Wireless Communications Engineering 3
- EE 508 Intelligent Decision Systems 3
- EE 640 Communication Protocols: OSI model and TCP/IP Protocol Stack 3
- EE 542 Network Architectures 3
- EE 740 Intrusion Detection Algorithms 3
- EE 750 Internet of Things and Security 3
- EE 617 Data Operations and Security 3
- EE 613 Advanced Cyber Security Principles 3
- EE 751 Wireless Sensor Networks 3
- EE 752 Introduction to Autonomous Systems 3
- EE 615 Cyber Forecasting 3
- EE 537 Graduate Cooperative Education 3
- EE 570 Seminar 1
- MATH 425 Cryptological Mathematics 3
- CSCI 487 Penetration Testing 3
- CSCI 551 Security for Cloud Computing 3
- CSCI 552 Cyber Physical Systems Security 3
Master of Science in Electrical Engineering

Admission Requirements
The applicant must meet the School of Graduate Studies' current minimum general admission requirements as published in the graduate catalog.

1. Bachelor of Science degree in Electrical Engineering or closely related field. Students holding B.S. degrees in other fields, e.g., physics, mathematics, and computer science, may be admitted to Provisional or Qualified status until selected undergraduate requirements in electrical engineering have been satisfied.
2. An overall undergraduate GPA of at least 2.75 or a GPA of at least 3.00 for the last two years.
3. Satisfy the School of Graduate Studies’ current minimum English Language Proficiency requirements as published in the graduate catalog. Applicant holding degrees from non-ABET accredited programs/universities are strongly recommended to submit scores from the General Test of Graduate Record Examination.

Degree Requirements
Thesis Option:
1. A minimum of 30 semester credits, including credits granted for the thesis.
2. A minimum of 21 semester credits, including thesis credits, must be in the major field of electrical engineering.
3. A minor field of study can be obtained by completing 9 semester credits from another department that offers a graduate program. A graduate faculty member from that department must serve on the thesis committee of the student.
4. A cognate can be obtained by completing 9 semester credits from more than one department outside of electrical engineering, or from a single department that does not offer a graduate program.
5. At least one-half of the coursework credits must be at or above the 500-level.
6. A maximum of 9 semester credits of the credit hours required for the degree may be transferred from another institution.
7. A maximum of 6 credit hours of EE 591 Electrical Engineering Research is acceptable.
8. Completion of a research project, submission of a thesis report, and a thesis defense.
9. An overall GPA of 3.00 or better in all coursework.
10. The thesis course (EE 599) can be between 6-9 credits with approval of the thesis committee.
11. One credit of seminar class (EE 570) is mandatory for each MS student.
12. At least two peer-reviewed conference, journal, or patent applications (as the first author) submitted with the consent of student’s advisor, must be accepted or published before the date of defense.

Non-Thesis Option:
1. Completion of at least 30 semester credits, including credits required for the major.
2. 3 credit hour EE 997 Independent Study (requires a written report approved by the faculty advisor) is acceptable.
3. At least 15 coursework credits must be at or above the 500-level.
4. A maximum of 9 semester credits of the credit hours required for the degree may be transferred from another institution.
5. A maximum of 3 credit hours of EE 591 Electrical Engineering Research is acceptable.
6. An overall GPA of 3.00 or better in all coursework.
7. Student has to successfully complete a comprehensive final examination on three general areas approved by the candidate’s faculty advisor.
8. At least one peer-reviewed conference, journal, or patent application (as the first author) must be submitted with the consent of student’s advisor.

Energy Systems Engineering

M.S. in Energy Systems Engineering (p. 450)
M.Engr. in Energy Systems Engineering (p. 450)
Ph.D. in Energy Engineering (p. 449)

Courses

SEE 510. Process Design & Feasibility Assessment of Sustainable Technologies. 3 Credits.
The research-to-commercialization life cycle and evaluation methods are examined in depth using sustainable energy technologies as specific case studies.

SEE 590. Special Topics in Sustainable Energy Engineering. 1-6 Credits.
Investigations of special topics in sustainable energy engineering dictated by students and faculty interests. Repeatable. Prerequisite: Consent of instructor. Repeatable.

Doctor of Philosophy in Energy Engineering

Admission Requirements
The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog. Additional requirements include:

1. B.S. degree in an engineering discipline from an ABET accredited program with a GPA of at least 3.0 or a M.S. degree in an engineering discipline with a GPA of at least 3.0. Students holding a B.S. degree in a science or other engineering-related field may be admitted to Qualified Status with an obligation to acquire background undergraduate engineering knowledge. The exact requirements will be determined on a case-by-case basis.
2. Graduate Record Examination General Test for those with undergraduate degrees from non-ABET accredited programs.
3. Satisfy the School of Graduate Studies’ current English Language Proficiency requirements as published in the graduate catalog.

Degree Requirements
Students seeking the Doctor of Philosophy degree at the University of North Dakota must satisfy all general requirements set forth by the Graduate School. The following requirements are in addition to the UND graduate school general requirements for the Ph.D.:

1. A minimum of 90 semester credits, including acceptable master’s degree work and credits granted for the dissertation and the research leading to the dissertation. These 90 credits should include:
   - 30 to 48 semester credits of coursework taken from the approved list published by the Energy Engineering program. Other courses may be accepted with approval of the student’s faculty advisor and the graduate dean.
   - 12 credits of dissertation.
2. Successful completion of an oral comprehensive exam when at least 45 post baccalaureate credits have been completed. This exam will be based on core courses taken for this degree and their application to the student’s research. The exam will be administered by at least three graduate faculty members from the Institute for Energy Studies and its Faculty Affiliates. Candidates who fail the exam will be allowed one opportunity to repeat the exam. The reexamination must take place no later than 13 months after the initial exam attempt.
3. Students must present to their advisory committee an annual oral progress report describing research progress.
4. Preparation and defense of a dissertation documenting original and independent research on a topic related to energy engineering.
5. Scholarly Tools: Engineering and mathematics courses required to fulfill the requirements for those students admitted under Qualified Status. Scholarly tools courses taken for graduate credit after a student
has enrolled in a graduate program at UND may be counted to fulfill requirements listed in Item 1.

6. There is no residency requirement for this program.

Master of Engineering in Energy Systems Engineering

Admission Requirements
The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. B.S. degree in an engineering or related field. Students holding a B.S. degree in a science or other related field may be admitted to Qualified Status with an obligation to acquire a background engineering knowledge. The exact requirements will be determined on a case-by-case basis.

2. An overall undergraduate GPA of at least 2.50, or 3.00 for the last two years.

3. Graduate Record Examination General Test for those with undergraduate degrees from non-ABET accredited programs.

4. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

Degree Requirements
1. A minimum of 30 credits of coursework selected in collaboration with the student’s advisor and approved by the program’s graduate director.

2. At least one-half of the credits must be at or above the 500-level.

3. A maximum of nine semester credits may be transferred from another institution.

4. A minimum of 24 credits of coursework selected in collaboration with the student’s advisor and approved by the program’s graduate director.

5. Preparation of a written independent study report approved by the faculty advisor.

6. A formal defense of the student's independent study.

Environmental Engineering

M.S. in Environmental Engineering (p. 451)

M.Engr. in Environmental Engineering (p. 451)

Ph.D. in Environmental Engineering (p. 451)

Certificate in Environmental Engineering (p. 450)

Courses
ENVE 562. Seminar in Environmental Engineering. 1 Credit.
Conferences, seminars, and reports on current developments in environmental engineering. Students will participate in professional presentations on topics relevant to environmental engineering. Students will also report the results of their graduate research or present information on other technically relevant topics approved by the course instructor. Repeatable.

ENVE 590. Special Topics in Environmental Engineering. 1-3 Credits.
Topics of current interest. Repeatable. Repeatable.

ENVE 591. Environmental Engineering Research. 1-6 Credits.
Supervised research work in environmental engineering. Repeatable to 24 credits. Repeatable to 24 credits.

ENVE 595. Design Project. 3-6 Credits.
Engineering design experience involving individual effort and formal written report and presentation.

ENVE 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

ENVE 998. Thesis. 1-9 Credits.
Development and documentation of scholarly activity demonstrating proficiency in Environmental Engineering at the master's level. Repeatable to 9 credits. Repeatable to 9 credits. F.S, SS.

Certificate in Environmental Engineering

Admission Requirements
The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. Bachelor of Science degree in an ABET accredited engineering program in Environmental, Chemical, Civil, or Geologic Engineering.

2. Students holding a B.S. degree in other engineering disciplines or in a science field with an appropriate background in chemistry, fluid mechanics, and mathematics may also be admitted.

3. An overall undergraduate GPA of at least 2.50 or 3.00 for the last two years.

The courses taken in a previously completed Environmental Engineering Certificate Program may be applied to a Master's degree in Engineering.

Certificate Requirements
1. A total of nine (9) credit hours must be completed in Graduate level courses listed as Environmental Engineering, Chemical Engineering, Civil Engineering, Geology, or Geological Engineering, and identified as qualified courses for the certificate.

2. A minimum GPA of 3.00 is required to earn the certificate.
Courses shall only count as credit toward fulfilling the requirements listed above when a grade of C or greater has been awarded at the completion of the course.

Doctor of Philosophy in Environmental Engineering

Admission Requirements

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog. Additional requirements include:

1. B.S. degree in an engineering discipline from an ABET accredited program with a GPA of at least 3.0 or a M.S. degree in an engineering discipline with a GPA of at least 3.0. Students holding a B.S. degree in a science or other engineering-related field may be admitted to Qualified Status with an obligation to acquire background undergraduate engineering knowledge. The exact requirements will be determined on a case-by-case basis.
2. Graduate Record Examination General Test for those with undergraduate degrees from non-ABET accredited programs.
3. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

Degree Requirements

Students seeking the Master of Science degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies’ as well as particular requirements set forth by the Environmental Engineering Program.

1. A minimum of 32 semester credits, including the credits granted for the dissertation and the research leading to the dissertation. These 90 credits should include:
   - At least one-half of the credits must be at or above the 500-level.
   - A maximum of eight semester credits may be transferred from another institution.

2. At least one-half of the credits must be at or above the 500-level.
3. A maximum of eight semester credits may be transferred from another institution.

4. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

Degree Requirements

Students seeking the Doctor of Philosophy degree at the University of North Dakota must satisfy all general requirements set forth by the Graduate School. The following requirements are in addition to the UND graduate school general requirements for the Ph.D.:

1. A minimum of 90 semester credits, including acceptable master’s degree work and credits granted for the dissertation and the research leading to the dissertation. These 90 credits should include:
   - 30 to 48 semester credits of coursework taken from the approved list published by the Environmental Engineering program. Other courses may be accepted with approval of the student’s faculty advisor and the graduate director.
   - 30 to 48 semester credits of research.
   - 12 credits of dissertation.

2. Successful completion of an oral comprehensive exam when at least 45 post baccalaureate credits have been completed. This exam will be based on core courses taken for this degree and their application to the student’s research. The exam will be administered by at least three graduate faculty members from the Institute for Environmental Studies and its Faculty Affiliates. Candidates who fail the exam will be allowed one opportunity to repeat the exam. The reexamination must take place no later than 13 months after the initial exam attempt.
3. Students must present to their advisory committee an annual oral progress report describing research progress.
4. Preparation and defense of a dissertation documenting original and independent research on a topic related to environmental engineering.
5. Scholarly Tools: Engineering and mathematics courses required to fulfill the requirements for those students admitted under Qualified Status. Scholarly tools courses taken for graduate credit after a student has enrolled in a graduate program at UND may be counted to fulfill requirements listed in Item 1.
6. There is no residency requirement for this program.

Master of Science in Environmental Engineering

Admission Requirements

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. Bachelor of Science degree from an engineering program in Environmental, Chemical, Civil, or Geological Engineering. Students holding a B.S. degree in other engineering disciplines or in a science field may be admitted to Qualified Status with an obligation to acquire background undergraduate engineering knowledge. The exact requirements will be determined on a case-by-case basis.
2. An overall undergraduate GPA of at least 2.50, or 3.00 for the last two years.
3. Graduate Record Examination General Test for applicants from non-ABET accredited programs.
4. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

Degree Requirements

Non-Thesis Option

Students seeking the Master of Science degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies’ as well as particular requirements set forth by the Environmental Engineering Program.

1. A minimum of 30 credits of coursework selected in collaboration with the student’s advisor and approved by the program’s graduate director.
2. At least one-half of the credits must be at or above the 500-level.
3. A maximum of eight semester credits may be transferred from another institution.
4. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

Degree Requirements

Thesis Option

Students seeking the Master of Science degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies’ as well as particular requirements set forth by the Environmental Engineering Program.

1. A minimum of 30 semester credits, including the credits granted for the thesis and research leading to the thesis.
2. At least one-half of the credits must be at or above the 500-level.
3. A maximum of eight semester credits may be transferred from another institution.
4. A minimum of 21 credits of coursework selected in collaboration with the student’s advisor and approved by the program’s graduate director.
5. A thesis documenting research on a topic related to environmental engineering.
6. A formal defense of the student’s research.

Non-Thesis Option

Students seeking the Master of Science degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies’ as well as particular requirements set forth by the Environmental Engineering Program.

1. A minimum of 32 semester credits, including the credits granted for the independent study project.
2. At least one-half of the credits must be at or above the 500-level.
3. A maximum of eight semester credits may be transferred from another institution.
4. A minimum of 24 credits of coursework selected in collaboration with the student’s advisor and approved by the program's graduate director.
5. Preparation of a written independent study report approved by the faculty advisor.
6. A formal defense of the student's independent study.

Mechanical Engineering

M.S. in Mechanical Engineering (p. 455)
M.Engr. in Mechanical Engineering (p. 455)
Ph.D. in Mechanical Engineering (p. 453)
M.Engr. in Unmanned Aircraft Systems Engineering (p. 455)
M.S. in Unmanned Aircraft Systems Engineering (p. 456)

Graduate Certificate in Unmanned Aircraft Systems Engineering (p. 454)

Courses

ME 514. High Temperature Materials. 3 Credits.
Course Objectives: The objective of this course is to provide students with their first in-depth exposure to high temperature materials, with a primary focus on ceramics and ceramics matrix composites. This course covers the fundamentals of mechanics and microstructure of structural materials for different high-temperature applications. The main emphasis during this course will be ceramic based materials. In addition, other high temperature materials like superalloys, Carbon, and their composites will be also covered. During this course, fundamental topics like bonding, structure, defects, sintering and grain growth, oxidation, and phase equilibria will be covered in detail. In addition, students will also get exposure to the mechanisms of time-dependent deformation, failure mechanism at high temperature, and thermal properties. Finally, different materials used at high temperature (metals, ceramics and their composites) will be reviewed. The successful completion of this course will prepare students for interdisciplinary problem solving and development of high temperature materials from both industrial and research context. Prerequisite: ME 301. S. even years.

ME 523. Advanced Machine Design. 3 Credits.
Advanced design and analysis of machine components; kinematic synthesis and analysis of mechanisms, force analysis, rotor dynamics, gyro dynamics, stresses in thick cylinders and flywheels, lubrication, statistical considerations, energy methods, curved beams. Prerequisites: ME 322 and ME 323.

ME 524. Deformation and Fracture. 3 Credits.
Aspects of elasticity theory, continuum mechanics and fracture mechanics. Fundamental relationships between material structure and engineering properties. Principles and properties of composite materials. Prerequisite: ME 301 or consent of instructor.

ME 525. Metal Fatigue in Engineering. 3 Credits.
Metal fatigue in engineering, involving design, development, and failure analysis of components, structures, machines, and vehicles subjected to repeated loading. Prerequisite: ENGR 203 and ME 301, or consent of instructor.

ME 526. Advanced Vibrations. 3 Credits.
Advanced vibration theory including the solutions of multi-degree of freedom coupled systems, continuous systems, energy methods, and non-linear vibrations. Prerequisite: ME 426.

ME 529. Advanced Finite Element Methods. 3 Credits.
Computer-aided techniques for finite element analysis of engineering systems. Topics include solution algorithm for nonlinear methods, large deflection, inelastic and contact analysis, and analysis of vibrating systems. Prerequisite: ME 429 or consent of instructor.

ME 532. Advanced Dynamics. 3 Credits.
Kinematics and kinetics of plane and three-dimensional motion, vector mechanics, general methods of linear and angular momentum, generalized coordinates, and variational methods including Hamilton’s and Lagrange's equations. Prerequisites: ENGR 202 and MATH 266.

ME 542. Thermodynamics of Materials. 3 Credits.
Foundations of materials behavior in terms of energy and statistics. Topics will include entropy, free energy, phase equilibrium, ideal versus real solutions and diffusion. Prerequisites: ME 301 and ME 341, or consent of instructor.

ME 545. Fluidized-Bed Combustion Engineering. 3 Credits.
Fluidized-bed hydrodynamics and heat transfer. Design of fluidized-bed coal combustors. Combustion models and their significance. Prerequisite: ME 306 and ME 474, or consent of instructor.

ME 566. Introduction to Machine Vision. 3 Credits.
An introduction to machine vision providing students with a general understanding of the imaging process, feature extraction and matching, object detection and tracking, model fitting, and camera pose estimation. Prerequisites: ME 322, ENGR 200, and MATH 266. F, even years.

ME 574. Advanced Heat Transfer. 3 Credits.
Advanced study of conduction and radiation heat transfer. Solution methodologies to classical heat conduction problems will be introduced. Topics include: multidimensional steady conduction via separation of variables and principle of superposition; transient conduction with time-dependent boundary conditions via method of complex temperatures; numerical solutions to heat conduction problems; spectral dependence of radiation; blackbody and gray surface radiation; radiation exchange between surfaces; radiation shield. Prerequisite: ME 474 or consent of instructor.

ME 575. Conduction and Radiation Heat Transfer. 3 Credits.
Advanced study of conduction and radiation heat transfer. Solution methodologies to classical heat conduction problems will be introduced. Topics include: multidimensional steady conduction via separation of variables and principle of superposition; transient conduction with time-dependent boundary conditions via method of complex temperatures; numerical solutions to heat conduction problems; spectral dependence of radiation; blackbody and gray surface radiation; radiation exchange between surfaces; radiation shield. Prerequisite: ME 474 or consent of instructor.

ME 580. Introduction to Autonomous Robotics. 3 Credits.
An introduction to autonomous mobile robots including hardware, modeling, sensors, and basic localization and mapping techniques. Prerequisites: ME 322, ENGR 200, and MATH 266. F, odd years.

ME 590. Special Topics. 1-6 Credits.
Investigation of special topics dictated by student and faculty interests. May be repeated up to a total of 6 credits. Prerequisite: Departmental approval. Repeatable to 6 credits.

ME 591. Research in Mechanical Engineering. 1-6 Credits.
Independent graduate research in Mechanical Engineering. Repeatable to 6 credits. Repeatable to 6 credits.

ME 595. Design Projects. 3-6 Credits.
A three to six credit course of engineering design experience involving individual effort and formal written report. Prerequisites: Restricted to Master of Engineering students and subject to approval by the student's advisor.

ME 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

ME 997. Independent Study. 2 Credits.

ME 998. Thesis. 1-6 Credits.
Development and documentation of scholarly activity demonstrating proficiency in Mechanical Engineering at the master's level. Repeatable to 6 credits. F.S.SS.

ME 999. PhD Student Doctoral Dissertation. 1-18 Credits.
PhD student doctoral dissertation. Prerequisite: Admission to the PhD in Mechanical Engineering Program and consent of the instructor. Repeatable to 18 credits. S/U grading. F.S.SS.

Undergraduate Courses for Graduate Credit

ME 420. Composite Materials. 3 Credits.
Prerequisites: ME 301 and admission to the professional Mechanical Engineering program. On demand.
ME 424. Systems Dynamics and Control. 3 Credits.
Theory, analysis, and design of linear closed-loop control systems containing electronic, hydraulic, and mechanical components. Differential equations. LaPlace transforms, Nyquist and Bode diagrams are covered. Prerequisites: MATH 266, ME 322, and admission to the professional Mechanical Engineering program. On demand.

ME 426. Mechanical Vibrations. 3 Credits.
Vibration analysis and design as it applies to single and multi degree freedom mechanical systems, isolation and absorption of vibration, vibration of continuous systems, numerical methods of solution. Prerequisites: ENGR 202 with a grade of C or better, MATH 266, and admission to the professional Mechanical Engineering program. S.

ME 428. Advanced Manufacturing Processes. 3 Credits.
Individual projects involving the manufacturing economics and flow charts for selected products and basic technical principles of manufacturing processes. Includes laboratory. Prerequisites: ME 418 and admission to the professional Mechanical Engineering program. On demand.

ME 429. Introduction to Finite Element Analysis. 3 Credits.
Finite element analysis is introduced as a design tool. Emphasis is given to modeling techniques and element types. Matrix methods are used throughout the class. Prerequisites: ENGR 203 with a grade of C and admission to the professional Mechanical Engineering program. On demand.

ME 439. Introduction to Robotics. 3 Credits.
A systems engineering approach to robotics. Presents an introduction to manipulators, sensors, actuators, and end effectors for automation. Topics covered include kinematics, dynamics, control, programming of manipulators, pattern recognition, and computer vision. Prerequisites: ENGR 200 with a grade of C or better, MATH 166 with a grade of C or better, and admission to the professional Mechanical Engineering program. On demand.

ME 446. Gas Turbines. 3 Credits.
General principles, thermodynamics, and performance of gas turbine engines. Design consideration of engine components. Prerequisites: ME 341 with a grade of C or better and admission to the professional Mechanical Engineering program. On demand.

ME 449. Internal Combustion Engines. 3 Credits.
Fundamentals of spark ignition and compression ignition engines, related components and processes. Prerequisites: ME 342 and admission to the professional Mechanical Engineering program. On demand.

ME 451. Heating and Air Conditioning. 3 Credits.
Psychrometrics, heating and cooling loads and analysis of air conditioning systems. Prerequisites: ME 342 and admission to the professional Mechanical Engineering program or consent of instructor. Corequisite: ME 474. On demand.

ME 464. Computational Fluid Dynamics. 3 Credits.
Provides a practical experience using computational fluid dynamics and provides supporting material in fluid dynamics. The class is useful in understanding the need to resolve grids in boundary layers and other regions of high velocity gradients. The course is structured as half lecture and half laboratory. The lecture covers topics related to laminar and turbulence boundary layers with and without acceleration, turbulence modeling, wakes and jets. The laboratory provides experience in building grids using the program GAMBIT, the solid/fluid modeling and meshing program, and calculating solutions using FLUENT, a commercial flow solver. Prerequisites: ME 306, MATH 266, and admission to the professional Mechanical Engineering program. On demand.

ME 466. Aerodynamics. 3 Credits.
ME 466 Aerodynamics is an introductory course on the fundamentals of aerodynamics for engineers. The class will cover a review of fluid mechanics including boundary layers and compressible flow. The course topics include parameters for airfoil and wings, incompressible flow over airfoils and wings of infinite and finite span, compressible and transonic flow over wings and aircraft, supersonic flow over thin airfoils, and supersonic flow over wings and airplane configurations. The course will follow a standard text "Aerodynamics for Engineers," 6th Edition by Bertin and Cummings. The course will qualify as either a thermal fluid science elective or an aerospace concentration elective. Prerequisites: ME 306 and ME 341. S. odd years.

ME 476. Intermediate Fluid Mechanics. 3 Credits.

ME 477. Compressible Fluid Flow. 3 Credits.
Introduction to the theory and application of one-dimensional compressible flow. Course topics include isentropic flow in converging and converging/diverging nozzles, normal shock waves, oblique shock waves, Prandtl-Meyer flow, flow with friction and heat addition. Prerequisite: Admission to the professional Mechanical Engineering program. Prerequisites or Corequisites: ME 341 with a grade of C or better and ME 306. On demand.

ME 484. Ground Vehicle Dynamics. 3 Credits.
ME 484 is a junior and senior level elective course. This course deals with the design of ground vehicle suspension and steering systems. Vehicle ride, handling, safety systems are covered along with passive and active suspension control. Prerequisite: ME 322 and admission to the professional Mechanical Engineering program or consent of instructor. On demand.

ME 485. Multiphysics Modeling. 3 Credits.
Theory and techniques of modeling coupled thermal, fluid, mechanical, and/or electrical fields in components design. The focus is on the fundamental techniques used to simultaneously derive and solve coupled equations and the use of commercial multi physics finite element software. Prerequisite: ME 323.

ME 490. Special Laboratory Problems. 1-3 Credits.
Laboratory investigations of interest to students and faculty. Repeatable to maximum of 6 credits. Prerequisites: Consent of instructor and admission to the professional Mechanical Engineering program. Repeatable to 6 credits. On demand.

Doctor of Philosophy in Mechanical Engineering

Admission Requirements

1. A baccalaureate degree in an engineering or related discipline with a GPA of 3.5 or higher or a Master of Science degree in an engineering or related discipline.
2. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the Academic Catalog.
3. In addition to meeting the general provisions in the UND Academic Catalog and the minimum requirements in items 1-2 above, candidates are assessed using a holistic process that considers the student’s Record of Publications, GRE test scores (for students who are applying with a B.S. engineering degree from an non-ABET accredited program), transcripts of previous college work, relevant research and work experience, letters of recommendation, research interests, and English language skills. Students are strongly encouraged to contact individual faculty members in their area of research interest prior to applying.
4. Students admitted to an engineering M.S.M.E. program but meeting the minimum requirements in items 1-2 above, may, after one calendar year and upon the recommendation of his/her advisory committee, request to by-pass the master’s degree and work directly toward the Ph.D. degree. If the request is approved by the student’s advisory committee, the student will be given the qualifying exam. Passing this exam will advance the student to Approved Status in the Doctoral Program in Mechanical Engineering.

Financial Assistance

Financial aid in the form of teaching and research assistantships is available on a competitive basis. Students seeking financial aid should complete their applications by February 15th for Fall or Summer admission and September 15th for Spring admission to be given full consideration. Assistantships are renewable for up to four years of support if progress toward the degree and instructional/research service are satisfactory, subject to the availability of funding. Students should contact faculty in their area(s) of research interest to inquire about funding availability for upcoming terms.

Degree Requirements

Students seeking the Doctor of Philosophy degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Mechanical Engineering Doctoral Program. The following requirements are in addition to the UND School of Graduate Studies general requirements for the Ph.D.:
1. 90 semester credits beyond the baccalaureate degree must be completed.
2. A 3.0 GPA must be maintained for all classes completed as a graduate student.
3. Scholarly Tools: Proficiency in mathematics must be demonstrated by completing nine approved credits of mathematics intensive coursework (equivalent to UND 400-level or higher courses) with a grade of B or better.
4. A maximum of 30 credit hours can be transferred from a master’s program.
5. A minimum of 30 credit hours must be doctoral research and dissertation.
6. Exactly 3 credit hours of the ME 562 or ChE 562–Graduate Seminar must be taken.
7. A minimum of 39 credit hours of non-research/dissertation coursework is required (up to 21 credit hours of coursework may be transferred from a master’s program in fulfilling this requirement subject to the credit transfer limits described in the general section of this Academic Catalog). The coursework shall include a minimum of 27 credit hours of Mechanical Engineering (or relevant courses with the consent of the student’s advisor and advisory committee) coursework selected from the approved list of ME graduate level courses published in the UND Academic Catalog. Equivalent graduate level coursework may be transferred from a master’s program.
8. Four (4) written qualifying examinations must be successfully completed.

One of the exam topics must be applied mathematics. The other examination topics must be selected from the following list:

- Thermodynamics
- Fluid Mechanics
- Heat Transfer
- Materials Science
- Manufacturing
- Solid Mechanics
- Robotics
- Dynamics
- Controls
- Vibrations

Topics for the examinations should be selected in consultation with the student’s advisor.

Qualifying examinations will be offered once per year during the fifth week of the spring semester. Students must notify the ME Graduate Director no later than the end of the second week of the spring semester of (1) their intention to take the exams, (2) their selected exam topics. No student will be required to complete more than two exams per day. Each exam will be two hours in length. No later than the 10th week of each fall semester, faculty that will be administering spring exams will determine what, if any, reference materials students will be allowed to use during their exam. A list of potential exam administrators will be available from the ME Graduate Director. Students should consult individual faculty as the allowable materials may vary from exam to exam.

Students will be awarded a grade of pass (score of 80% or higher on all exams), conditional pass (80% or higher on three exams), or fail. Students achieving a grade of conditional pass may be required to retake the exam on which they scored <80%, enroll in specific courses, or complete other remedial actions at the discretion of the examining faculty and the student’s advisory committee. Students failing (<80%) two or three exams will be required to retake all four exams. Examination retakes must occur during the next regular qualifying examination period. Students failing all four exams will be removed from the PhD program at the end of the semester in which the exams were taken. Students failing an exam area more than once will be removed from the PhD program at the end of the semester in which the exam was retaken. A direct admit student who fails an exam a second time may request to be reclassified as a Master’s student at the discretion of the student’s advisor and the ME Graduate Director.

1. PhD students will complete a preliminary examination at least one year prior to their planned graduation date. The examination will consist of an oral presentation to their thesis committee of their progress to date and expected work to complete their degree. The committee will assess the presentation, progress and plan on a pass/fail basis. The preliminary examination must be passed prior to graduation. A student who fails the process more than once will be removed from the PhD program.
2. A candidate for the degree must complete the original basic research investigation as documented in the research proposal. Each candidate will complete the research investigation to the satisfaction of the research advisor and the advisory committee and will prepare a written dissertation covering the research. The project must represent an original and independent investigation by the student. It is expected that the results of the research will be submitted for publication in refereed research journals. The candidate will submit the dissertation to the examining committee at least four weeks prior to defense date. The examining committee consists of the student’s advisory committee and an external examiner from outside the Department. The Department encourages the addition of a member from outside the University.
3. The candidate must present and successfully defend the dissertation at the final examination (see School of Graduate Studies requirements (https://und.edu/academics/graduate-school)). Four results of the examination can be obtained: 1) pass; 2) minor revision 3) major revision and 4) fail. For minor revisions there is no need for another defense session and upon revising the dissertation the examining committee can pass the student. For major revisions the student is asked to fundamentally revise the methodologies and schedule another defense session. If failed, the student will not be able to obtain a PhD degree and may request to be reclassified as a master’s student and complete a Master of Science degree.
4. The candidate, with the consent of his/her advisor, must submit at least one peer reviewed journal article (as the first author), submit one conference paper (as the first author), and make one conference presentation.

Residence Requirements

The purpose of residence requirements is to provide an opportunity for a sustained and concentrated intellectual effort, to provide for immersion in an academic research environment, and to permit extensive interaction with fellow students and faculty of the Mechanical Engineering Department. Within the first two years of graduate work at UND, at least two consecutive semesters must be completed in residence. During residency, a student must be taking the appropriate credits to qualify as a full-time student. The student’s program of study must be completed within the seven-year period normally allowed for graduate programs.

Under special circumstances, the student in conjunction with his/her advisory committee and the Mechanical Engineering Graduate Faculty, can petition the Dean of the School of Graduate Studies for variances in this policy.

Graduate Certificate in Unmanned Aircraft Systems Engineering

This program prepares students who have a strong interest related to the Unmanned Aircraft Systems Engineering field. All of the general requirements for enrollment, participation, and completion of a degree documented in the catalog of the University of North Dakota as appropriate shall be required. Specific requirements over and above the general catalog requirements are as follows:

Admission Requirements

1. Bachelor of Science degree from an ABET accredited engineering program, or
2. Students holding a B.S. degree in other disciplines may be admitted to Qualified Status with an obligation to acquire the necessary background undergraduate engineering knowledge. The exact requirements will be determined on a case-by-case basis, and/or
3. Graduate Record Examination General Test for applicants from non-ABET accredited programs, and
4. Minimum G.P.A. is 3.0 (4.0 scale) is required. Conditional admittance may be obtained for G.P.A.s less than 3.0.

Certificate Requirements (9 Credits)

Choose 3 courses from the Required Core (9 Credits):

- ENGR 590 Special Topics in Engineering (UAS in Engineering Design and Application) 3
- EE 511 Power Electronics 3
- CSCI 490 Autopilot programming (Autopilot Programming) 3
- GEOL 474 (Introduction to GIS and Laboratory) 3
Master of Engineering in Mechanical Engineering

Admission Requirements
The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. B.S. degree in Mechanical Engineering from an ABET accredited program and have an acceptable GPA
2. GRE general test required for those applicants with undergraduate degrees from other than ABET accredited programs.
3. 2.50 overall undergraduate GPA or a GPA of at least 2.75 for the junior and senior years of their undergraduate programs.
4. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.
5. Students seeking admission to a combined B.S./Master’s program must have a GPA of at least 3.0 at the time of admission.

Students who hold an undergraduate engineering or science degree other than mechanical engineering may be admitted to provisional or qualified status with an obligation to acquire additional background in mechanical engineering as appropriate.

Degree Requirements
Students seeking the Master of Engineering degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies’ as well as particular requirements set forth by the Mechanical Engineering Department.

1. 30 credits of course work approved by the graduate advisor.
2. 15 credits at the 500 level or above.
3. 9 credits of engineering science, basic science, and/or mathematics.
4. All major department courses must be at the 400 level or above, and no courses below 300 level may be included in the program.

Master of Engineering in Unmanned Aircraft Systems Engineering

This program prepares students who have a strong interest related to the Unmanned Aircraft Systems Engineering field. All of the general requirements for enrollment, participation, and completion of a degree documented in the catalog of the University of North Dakota as appropriate shall be required. Specific requirements over and above the general catalog requirements are as follows:

Admission Requirements
1. Bachelor of Science degree from an ABET accredited engineering program, or
2. Students holding a B.S. degree in other disciplines may be admitted to Qualified Status with an obligation to acquire the necessary background undergraduate engineering knowledge. The exact requirements will be determined on a case-by-case basis, and/or
3. Graduate Record Examination General Test for applicants from non-ABET accredited programs, and
4. Minimum G.P.A. is 3.0 (4.0 scale) is required. Conditional admittance may be obtained for G.P.A.s less than 3.0.

Degree Requirements (30 Credits)

1. Required Core (12 credits):

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGR 590</td>
<td>Special Topics in Engineering (UAS in Engineering Design and Application)</td>
<td>3</td>
</tr>
<tr>
<td>EE 511</td>
<td>Power Electronics</td>
<td>3</td>
</tr>
</tbody>
</table>

2. Specialization Track (9 credits):

Select One
1. Mechanical Systems (3 courses from the Mechanical Engineering graduate course list)
2. Electrical Systems (3 courses from the Electrical Engineering graduate course list)
3. Computer Systems (3 courses from the Computer Science graduate course list)
4. Elective Courses (9 credits, approved by advisor)

Master of Science in Mechanical Engineering

Admission Requirements
The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. B.S. degree in Mechanical Engineering from an ABET accredited program and have an acceptable GPA.
2. GRE general test required for applicants with undergraduate degrees from other than ABET accredited programs.
3. 2.75 overall undergraduate GPA or a GPA of at least 3.00 for the junior and senior years.
4. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.
5. Students seeking admission to a combined B.S./Master’s program must have a GPA of at least 3.0 at the time of admission.

Students who hold an undergraduate engineering or science degree other than mechanical engineering may be admitted to provisional or qualified status with an obligation to acquire additional background in mechanical engineering as appropriate.

Degree Requirements
Students seeking the Master of Science degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies’ as well as particular requirements set forth by the Mechanical Engineering Department.

Thesis Option
1. A minimum of 30 semester credits in a major field approved by the graduate committee, including the credits granted for the thesis and the research leading to the thesis.
2. At least one-half of the credits must be at or above the 500-level.
3. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.
4. At least 21 credits of coursework.
5. Completion of a research project and its presentation in a thesis (4-6 credits for ME 998 Thesis).

Non-Thesis Option
1. Thirty-two (32) credits including credits approved by the graduate advisor required for the major.
2. Two credits of ME 997 Independent Study.
3. At least one-half of the credits must be at or above the 500-level.
4. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.
5. Preparation of a written independent study approved by the faculty advisor.
6. Comprehensive final examination.
The research project, independent study, or design project may be from interdisciplinary areas such as bioengineering or environmental engineering, or they may be topics in design, manufacturing processes, vibrations, stress analysis, materials, power, fluid mechanics, heat transfer, thermodynamics, or combustion.

**Master of Science in Unmanned Aircraft Systems Engineering**

This program prepares students who have a strong interest related to the Unmanned Aircraft Systems Engineering field. All of the general requirements for enrollment, participation, and completion of a degree documented in the catalog of the University of North Dakota as appropriate shall be required. Specific requirements over and above the general catalog requirements are as follows:

**Admission Requirements**

1. Bachelor of Science degree from an ABET accredited engineering program, or
2. Students holding a B.S. degree in other disciplines may be admitted to Qualified Status with an obligation to acquire the necessary background undergraduate engineering knowledge. The exact requirements will be determined on a case-by-case basis, and/or
3. Graduate Record Examination General Test for applicants from non-ABET accredited programs, and
4. Minimum G.P.A. is 3.0 (4.0 scale) is required. Conditional admittance may be obtained for G.P.A.s less than 3.0.

**Degree Requirements (30 Credits)**

1. **Required Core (18 credits):**
   - ENGR 590 Special Topics in Engineering (UAS in Engineering Design and Application) 3
   - EE 511 Power Electronics 3
   - CSCI 490 Autopilot Programming (Autopilot Programming) 3
   - GEOL 474 (Introduction to GIS and Laboratory) 3
   - Thesis 6

2. **Specialization Track (9 credits):**
   - Select One:
     - **Mechanical Systems** (3 courses from the Mechanical Engineering graduate course list)
     - **Electrical Systems** (3 courses from the Electrical Engineering graduate course list)
     - **Computer Systems** (3 courses from the Computer Science graduate course list)

3. **Electives (3 credits approved by advisor)**
4. **Cooperative Education (industrial or research lab, 0-3 credits)**

**English Language and Literature**

**M.A. in English (p. 458)**

**Ph.D. in English (p. 457)**

**Courses**

**ENGL 500. Introduction to Graduate Studies. 2 Credits.** Required of all candidates for advanced degrees in English. An introduction to graduate study and the profession.

**ENGL 501. Teaching College English. 3 Credits.** An introduction to theories and methods of teaching college English. Required of Graduate Teaching Assistants in English.

**ENGL 501L. Teaching College English Laboratory. 1 Credit.** The practicum part of English 501. Required of Graduate Teaching Assistants in English. S/U grading.

**ENGL 510. History of Literary Criticism. 3 Credits.** A history of European criticism from the Classical Greek period to the present day, with emphasis on major texts.

**ENGL 511. Problems in Literary Criticism. 3 Credits.** A course in applied criticism. Repeatable when topics vary. Repeatable.

**ENGL 516. Creative Writing: Fiction Workshop. 3 Credits.** Allows students to receive graduate-level instruction in a workshop setting, meeting regularly with other students, sharing their work, and critiquing one another's work. The purpose of this course is to enable the student to produce fiction of professional quality, such as that needed for a graduate thesis in creative writing. Repeatable to a total of 6 credits for M.A. students, 9 credits for Ph.D. students. Prerequisite: Upper-division undergraduate work in creative writing or permission of instructor. Repeatable to 6 credits.

**ENGL 517. Creative Writing: Poetry Workshop. 3 Credits.** This course allows students to receive graduate-level instruction in a workshop setting, meeting regularly with other students, sharing their work, and critiquing one another's work. The purpose of this course is to enable the student to produce poetry of professional quality, such as that needed for a graduate thesis in creative writing. Repeatable to a total of 6 credits for M.A. students, 9 credits for Ph.D. students. Prerequisites: ENGL 413 or 414, upper-division undergraduate work in creative writing or permission of instructor. Repeatable to 6 credits.

**ENGL 520. Studies in English Literature. 1-3 Credits.** The subject of study will vary from semester to semester, and the course may be repeated for credit when the subject of study differs. Repeatable.

**ENGL 521. Studies in American Literature. 1-3 Credits.** The subject of study will vary from semester to semester, and the course may be repeated for credit when the subject of study differs. Repeatable.

**ENGL 522. Studies in English Language. 1-3 Credits.** The subject of study will vary from semester to semester, and the course may be repeated for credit when the subject of study differs. Repeatable.

**ENGL 524. Studies in Creative Writing. 3 Credits.** Topics vary, such as advanced workshops in different genres and "reading for writers," studying the works of published writers as models for students' own creative work. Prerequisites: ENGL 516 or ENGL 517, or consent of instructor. Repeatable.

**ENGL 525. Studies in Composition and Rhetoric. 3 Credits.** This course investigates selected topics in composition and rhetorical studies. The subject of study will vary from semester to semester, and the course may be repeated for credit when the subject of study differs. Repeatable to 12 credits. On demand.

**ENGL 531. Seminar in English Literature. 3 Credits.** This class requires the preparation and delivery of a long research paper on an appropriate topic. Repeatable. Repeatable.

**ENGL 532. Seminar in American Literature. 3 Credits.** Similar in method to English 531. Repeatable. Repeatable.

**ENGL 533. Seminar in English Language. 3 Credits.** Similar in method to English 531. Repeatable. Repeatable.

**ENGL 590. Readings. 1-4 Credits.** American Literature; Cinema; English Literature; English Language; or Creative Writing. Supervised independent study. Repeatable. Prerequisites: ENGL 500 and department consent. Repeatable.

**ENGL 591. Readings for Ph.D. Comprehensive Examinations. 1-6 Credits.** Supervised independent study on approved topics. Repeatable for a maximum of 6 credits. This course is exempt from the normal "Incomplete" reversion schedule. A grade is assigned upon completion of the appropriate comprehensive examination. Prerequisites: Department consent. Repeatable to 6 credits. On demand.

**ENGL 593. Research. 1-4 Credits.** American Literature; Cinema; English Literature; English Language; or Creative Writing. Independent study of a problem in the field resulting in a long research paper or a series of short reports. Repeatable. Prerequisites: ENGL 500 and department consent. Repeatable.
ENGL 398. Portfolio Workshop. 3 Credits.
This course is designed to further explore the rhetorical strategies of academic writing in the discipline of English and to support students through the development of the Portfolio thesis. Permission of Director of Graduate Studies is required. Prerequisite: Permission of Graduate Director. S/U grading.

ENGL 399. Special Topic. 1-3 Credits.
A course on varying topics. Repeatable. F.S.

ENGL 495. Scholarly Project. 2 Credits.
As a common course number uniform throughout the graduate school, English 995 Scholarly Project will serve the purpose described in the graduate catalog as a required component of the non-thesis option in fulfillment of the M.A. degree. F.S,SS.

ENGL 496. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

ENGL 497. Independent Study. 2 Credits.

ENGL 498. Thesis. 1-4 Credits.
Repeatable to 4 credits.

ENGL 999. Dissertation. 1-15 Credits.
Repeatable to 15 credits.

Undergraduate Courses for Graduate Credit

ENGL 408. Writing for Digital Environments. 3 Credits.
Advanced writing in and for digital platforms. Prerequisite: ENGL 120 or ENGL 125 or ENGL 130. On demand.

ENGL 409. Art of the Cinematic Drama. 3 Credits.
An investigation of the aesthetics of the film drama with a concentration on the theory and evaluation of the medium. This course examines the relationship of the verbal and visual arts. Repeatable when topics vary. Prerequisite: ENGL 225. Repeatable. S.

ENGL 410. Studies in Literary Periods. 3 Credits.
Period-specific study of literature. Repeatable if topics vary. Repeatable to 12 credits. On demand.

ENGL 413. The Art of Writing: Poetry. 3 Credits.
Intermediate and advanced-level study and practice of poetry-writing. Repeatable once. Prerequisite: ENGL 226 or instructor's permission. Repeatable to 6 credits. F.

ENGL 414. The Art of Writing: Fiction. 3 Credits.
Continues the work of ENGL 306, Creative Writing: Fiction, at the advanced level. Prerequisite: ENGL 306 or instructor's permission. Repeatable to 6 credits. S.

ENGL 415. Seminar in Literature. 1-4 Credits.
A course for advanced students on topics varying from year to year. Repeatable. Repeatable. S.

ENGL 418. Second Language Acquisition. 3 Credits.
This course focuses on recent second language acquisition (SLA) research findings from the areas of linguistics, psychology, education, and communication and on how to relate these findings to language learning and teaching. Prerequisite: ENGL 209. F.

ENGL 419. Teaching English as a Second Language. 3 Credits.
An introduction to the principles of teaching English as a second language, with special attention to tutoring. Prerequisite: ENGL 209. F.

ENGL 428. Digital Humanities. 3 Credits.
Examines the growing necessity for digital products in the humanities and moves the concept of publishing from hard copy to electronic copy. Students will have hands-on opportunities to create new knowledge by working on projects across campus such as digitizing materials in the library's special collections department and working directly with professors' research initiatives. F, even years.

ENGL 422. History of the English Language. 3 Credits.
The development of the language from the earliest times to the present. This course is recommended for all prospective English teachers. S.

Doctor of Philosophy in English

Admission Requirements

The applicant must meet the School of Graduate Studies' current minimum general admission requirements as published in the graduate catalog.

1. A four-year bachelor's degree from a recognized college or university.
2. Twenty semester credits of English beyond the communication requirement with a 3.00 grade point average or better.
3. Undergraduate work in at least one language other than English equivalent to the first two college-level years or by demonstrating (by Educational Testing Service or by Languages Department examination) a reading knowledge of one language other than English or the satisfactory completion of two semesters each of two languages other than English. In some cases, students may be admitted without the language requirement and may complete it as part of the MA. program.
4. A writing sample of 10-15 pages on topics or in modes appropriate to the proposed program of study (submitted directly to the department). Applicants who plan to major in creative writing should also submit an analytical paper.
5. Graduate Record Examination General Test required. Literature in English Advanced Test is recommended.
6. Satisfy the School of Graduate Studies' English Language Proficiency requirements as published in the graduate catalog.
7. A master's degree of at least 30 semester credits of courses in literature and English language or in an acceptable combination of these and related subjects. (Graduate courses taken elsewhere may, at the discretion of the Department, be accepted in lieu of courses that would otherwise be related at the University of North Dakota.)

Degree Requirements

Students seeking the Doctor of Philosophy degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the English Language and Literature Department.

1. ENGL 500 Introduction to Graduate Studies; ENGL 501 Teaching College English and ENGL 501L Teaching College English Laboratory (for Graduate Teaching Assistants only); and either ENGL 510 History of Literary Criticism or ENGL 511 Problems in Literary Criticism. Courses must be completed with grades of A or B (S for ENGL 501L Teaching College English Laboratory).
2. Up to ten credits in addition to the four credits allowed for the M.A. may be in Readings and Research courses.
3. ENGL 590 Readings 1-4
   ENGL 591 Readings for Ph.D. Comprehensive Examinations 1-4
   ENGL 593 Research 1-4
4. Evidence of the mastery of scholarly tools appropriate to the proposed field of studies is required, including proficiency in one language other than English to Level IV. Additional language study and/or other scholarly tools may be required as deemed appropriate by the student in consultation with his/her mentor, advisory committee, and the Director of Graduate Studies.
5. Completion of the comprehensive examinations, in areas or topics relevant to a student’s individual interests as recommended by the student’s Advisory Committee. These will include three written comprehensive exams: 1) a written major field exam; 2) a written second field exam; and 3) a written special topic exam. The major and second field exams provide the kind of breadth of knowledge that goes beyond that developed through graduate coursework alone while the special topic exam is designed to begin the thought process necessary to conceptualizing and completing the dissertation. A fourth exam, an oral exam on the dissertation prospectus, is scheduled and completed within six months after completion of the written exams.
6. Fifteen (15) hours of credit may be granted for the dissertation, which may take the form of either a closely focused scholarly-critical investigation of a single topic, a creative work or group of works, or a number of related, publishable essays (critical, scholarly, bibliographical, methodological, pedagogical) which may be developed in combination with a project or
projects deemed appropriate and acceptable by the student’s Advisory Committee.

NOTE: Students may be recommended for advancement to candidacy for the doctoral degree only after they have satisfied the following requirements in addition to those required by the School of Graduate Studies: Completion of ENGL 500 Introduction to Graduate Studies and either ENGL 510 History of Literary Criticism or ENGL 511 Problems in Literary Criticism with grades of A or B; for Graduate Teaching Assistants, ENGL 501 Teaching College English with a grade of A or B and ENGL 501L Teaching College English Laboratory with a grade of S.

Master of Arts in English

Admission Requirements

Applications for admission must be completed by February 1 for full consideration and Teaching Assistantships. The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. A four-year bachelor’s degree from a recognized college or university.
2. Twenty semester credits of English beyond the communication requirement with a 3.00 grade point average or better.
3. A writing sample of 10-15 pages on topics or in modes appropriate to the proposed program of study (submitted directly to the department). Applicants who plan to major in creative writing should also submit an analytical paper.
4. Graduate Record Examination General Test required. Literature in English Advanced Test is recommended.
5. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

Degree Requirements

Students seeking the Master of Arts degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the English Language and Literature Department.

Thesis Option

1. A minimum of thirty-two credit hours are needed for the M.A., including the required courses listed below, the thesis (4 credits), and any Readings/Research courses (maximum 4 credits).
2. At least one-half of the credits must be at or above the 500-level.
3. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.
4. ENGL 500 Introduction to Graduate Studies; ENGL 501 Teaching College English and ENGL 501L Teaching College English Laboratory (for Graduate Teaching Assistants only); and either ENGL 510 History of Literary Criticism or ENGL 511 Problems in Literary Criticism. Courses must be completed with grades of A or B (S for ENGL 501L Teaching College English Laboratory).
5. Up to 4 credits of Readings and Research courses (ENGL 590 Readings and ENGL 593 Research) may be used to supplement the standard graduate offerings.
6. Evidence of the mastery of scholarly tools appropriate to the proposed field of studies is required, including Level IV proficiency in one language other than English.
7. The Critical Introductory Statement to the Portfolio will serve as the written comprehensive exam.
8. Required courses:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ENGL 998 Thesis</td>
<td>4</td>
</tr>
<tr>
<td>Total Credits</td>
<td>27-30</td>
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</tbody>
</table>

Non-Thesis Option

1. A minimum of thirty-two credit hours are needed for the M.A., including the required courses listed below, ENGL 598 Portfolio Workshop and ENGL 995 Scholarly Project, and any Readings/Research courses (maximum 4 credits).
2. At least one-half of the credits must be at or above the 500-level.
3. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.
4. ENGL 500 Introduction to Graduate Studies; ENGL 501 Teaching College English and ENGL 501L Teaching College English Laboratory (for Graduate Teaching Assistants only); and either ENGL 510 History of Literary Criticism or ENGL 511 Problems in Literary Criticism. Courses must be completed with grades of A or B (S for ENGL 501L Teaching College English Laboratory).
5. Up to 4 credits of Readings and Research courses (ENGL 590 Readings and ENGL 593 Research) may be used to supplement the standard graduate offerings.
6. Evidence of the mastery of scholarly tools appropriate to the proposed field of studies is required, including Level IV proficiency in one language other than English.
7. The Critical Introductory Statement to the Portfolio will serve as the written comprehensive exam.
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<tr>
<td>ENGL 500</td>
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<td>ENGL 501</td>
<td>3</td>
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<tr>
<td>ENGL 501L</td>
<td>1</td>
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<tr>
<td>ENGL 510 or ENGL 511</td>
<td>3</td>
</tr>
<tr>
<td>Electives</td>
<td>14-17</td>
</tr>
<tr>
<td>Total Credits</td>
<td>29-32</td>
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Geography and Geographic Information Science

M.S. in Geography (p. 460)
M.A. in Geography (p. 460)

Certificate in Geographic Information Science (GISc)

The Geography department offers a graduate certificate in Geographic Information Science (GISc). GISc is the foundation of Geographic Information Systems (GIS), which integrate spatial data sets in the form of digital maps, digital aerial photos, satellite imagery, and global positioning system (GPS) coordinates. The goal of GISc is to model landscapes digitally and to enable the characterization of spatial and temporal processes.

Certificate students must be admitted to UND as either full or part-time graduate students. Application for admission must be made to the UND School of Graduate Studies. The certificate is designed to serve:

1. non-geography graduate students currently pursuing a graduate degree from UND, and
2. non-degree-seeking professionals already holding a graduate and/or baccalaureate degree who seek to "re-tool."

The courses taken in a previously completed GISc certificate program may be applied to a Master’s degree in Geography.

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<th>Course</th>
<th>Credits</th>
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<tr>
<td>ENGL 998</td>
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<td>Total Credits</td>
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<td>14-17</td>
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<tr>
<td>Total Credits</td>
<td>29-32</td>
</tr>
</tbody>
</table>
Admission Requirements
1. A baccalaureate degree from an accredited university.
2. A GPA of at least 2.75 in all undergraduate work.

Certificate Requirements
Successful completion of the 12-credit GISc Certificate requires the following:
1. Completion of the nine credits of core courses (see below).
2. Completion of at least three credit hours of elective courses (see below).
3. A minimum grade point average of 3.00.
4. Completion time of no more than five years.

5. Required Core Courses
GEOG 471 & 471L Cartography and Visualization and Cartography and Visualization Laboratory 3
GEOG 474 & 474L Introduction to Geographic Information Systems (GIS) and GIS Laboratory 3
GEOG 574 Advanced Techniques in Geographic Information Systems 3

Elective Courses
Select one of the following: 3
GEOG 377 & 377L Quantitative Applications in Geography and Spatial Analysis Laboratory
GEOG 475 Digital Image Processing
GEOG 476 Selected Topics in Geographic Information Systems
GEOG 575 Seminar in Remote Sensing
GEOG 591 Directed Study in Geographical Problems

Total Credits 12

Courses
GEOG 500. Graduate Studies in Geography. 1 Credit.
An overview of contemporary research in geography. Includes a field trip and discussions on the differences between graduate and undergraduate education, as well as strategies for successful completion of a graduate degree.

GEOG 501. Geographic Thought Through Time. 2 Credits.
Required of all graduate students. A scholarly examination of the scope and content of geography from its inception to the present.

GEOG 521. Advanced Physical Geography. 3 Credits.
An investigation of an advanced topic in physical geography. May be repeated if a different topic is examined. Prerequisite: Instructor consent. Repeatable.

GEOG 537. Graduate Cooperative Education. 1-3 Credits.
Practical experience of applying advanced concepts of geography. Experience will vary from student to student and must be coordinated with co-op host. Prerequisites: MS/MA students must have minimum of 12 graduate credits and permission of department chair or co-op coordinator.

GEOG 551. Advanced Human Geography. 3 Credits.
An investigation of an advanced topic in human geography. May be repeated if a different topic is examined. Prerequisite: Instructor consent. Repeatable.

GEOG 574. Advanced Techniques in Geographic Information Systems. 3 Credits.
An advanced course designed to extend GIS knowledge and experience and to prepare students to become effective GIS analysts. The course follows a hands-on, problem-solving approach that integrates the interests and analytical needs to participating students. Prerequisite: GEOG 474 or an equivalent approved by the department.

GEOG 575. Seminar in Remote Sensing. 3 Credits.
A seminar in the analysis of remote sensing techniques as applied to contemporary research problems in geography. Prerequisite: GEOG 475 or consent of instructor.

GEOG 576. Field Methods and Analysis in Geography. 3 Credits.
An advanced, intensive approach to the measuring and mapping of cultural and physical features of the earth in the field. Familiarization with the practical problems involved in data collection techniques in rural as well as urban areas and transfer of the pattern of phenomena of an area to a scale suitable for mapping.

GEOG 578. Geographic Research and Writing. 3 Credits.
Required of all graduate students. Orientation to methods of research and communication in geography. Emphasis upon research design, identification of bibliographic and geographic source materials, communication skills, and proposal writing. Prerequisite: Graduate standing.

GEOG 591. Directed Study in Geographical Problems. 1-4 Credits.
Directed advanced research in a specialized field of geographic study. May be repeated up to a total of 9 credits. Prerequisite: Consent of instructor. Repeatable to 9 credits. F,S,SS.

GEOG 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

GEOG 997. Independent Study. 2 Credits.
GEOG 998. Thesis. 1-6 Credits.
Repeatable to 6 credits.

Undergraduate Courses for Graduate Credit
GEOG 421. Selected Topics in Physical Geography. 3 Credits.
An examination of an advanced physical geography topic chosen from field methods, biogeography, human impact on the environment, physiography, or others. Repeatable to nine credits if different topics are examined. Prerequisite: GEOG 121 or consent of instructor. Repeatable to 9 credits. F,S.

GEOG 453. Historical Geography. 3 Credits.
Using the spatial approach, landscape change is analyzed over time in various regions of the world using a variety of scales of study. Emphasis is placed upon the relationship of historical geography to historic preservation and tourism. On demand.

GEOG 457. Urban Geography and Planning. 3 Credits.
This course examines the internal workings of cities from political, economic, and social perspectives. Geographic approaches to urban analysis are discussed, as are various methods for contemporary urban planning. Students learn to view the city as a geographic phenomenon created by human effort.

GEOG 462. Geography of North America II. 3 Credits.
A regional analysis of the physical, cultural, and economic features of a selected region or group of regions within North America. May be repeatable to six credits if a different region is examined. Prerequisite: GEOG 262 or consent of instructor. On demand.

GEOG 463. Regional Geography. 2-3 Credits.
A regional and topical analysis of the physical and cultural features with emphasis on one continent or region. May be repeated up to nine credits provided different regions and approaches are involved. Repeatable to 9 credits. S.

GEOG 471. Cartography and Visualization. 2 Credits.
This course examines the art, science, and technology of cartography and visualization. It familiarizes students with basic cartographic principles and with GIS, both of which are applicable to a wide range of professional fields and academic disciplines. Students learn how maps are designed and used to accurately represent and effectively communicate spatial phenomena and relationships. The course also includes a discussion of selection of proper thematic mapping techniques. Corequisite: GEOG 471L. F.

GEOG 471L. Cartography and Visualization Laboratory. 1 Credit.
Students apply concepts learned in GEOG 471 to produce accurate, appropriate and well-designed maps using GIS software. Lab activities hone the ability of students to be informed producers and consumers of maps and provide hands-on experience that demonstrates how maps function as a communicative visual medium. Corequisite: GEOG 471L. F.

GEOG 474. Introduction to Geographic Information Systems (GIS). 2 Credits.
An introductory course that examines the digital representation, manipulation, and analysis of geographic data, with emphasis on the analytical capabilities that GIS brings to bear on the solution of geographic problems. Prerequisites: GEOG 471 and 471L or equivalent or consent of instructor. Corequisite: GEOG 474L. F,S.

GEOG 474L. GIS Laboratory. 1 Credit.
Hands-on application of theory and methods associated with digital spatial data representation, manipulation, and analysis. Corequisite: GEOG 474. F,S.
Master of Arts in Geography

Admission Requirements

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. A four-year bachelor’s degree from a recognized college or university.
2. A GPA of at least 3.00 in all undergraduate work.
3. A minimum of 9 semester credits of undergraduate coursework in geography, preferably in human geography. An additional 6 credits in fields cognate to geography are also required. Cognate courses must be from at least two academic departments outside Geography.
4. Meet all School of Graduate Studies requirements for admission.
5. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

Outstanding applicants are evaluated on an individual basis and those with limited backgrounds in geography but a distinguished record in another discipline may be accepted in a qualified or provisional status.

Degree Requirements

Students seeking the Master of Arts degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Geography Department.

1. Four required courses:
   - GEOG 500 Graduate Studies in Geography
   - GEOG 501 Geographic Thought Through Time
   - GEOG 576 Field Methods and Analysis in Geography
   - GEOG 578 Geographic Research and Writing

   Total Credits 8

2. A minor or cognate area of study, and a graduate program of study that reflects the student’s focus on human geography topics (9 credits).

Thesis

1. A minimum of 30 semester credits, including 9 semester credits for approved minor or cognate courses.
2. At least one-half of the credits must be at or above the 500-level.
3. A maximum of one-fourth (usually 8-9 semester credits) of the credit hours required for the degree may be transferred from another institution.
4. Preparation and successful defense of a thesis. (A minimum of 6 credits for GEOG 998 Thesis.)

Non-Thesis

1. A minimum of 36 semester credits, including 9 semester credits for approved minor or cognate courses.
2. A minimum of 12 credits that focus upon geospatial skills and techniques which include quantitative methods, computer graphics and mapping, geographic information systems, remote sensing, field methods, and cartography. The non-thesis programs emphasize development of geospatial skills that can be applied to specific problems and projects that may or may not involve research.
Geology and Geological Engineering

M.S. in Geology (p. 463)
M.A. in Geology (p. 463)
Ph.D. in Geology (p. 462)

M.S. in Geological Engineering (http://und-public.courseleaf.com/graduateacademicinformation/departmentalcoursesprograms/engineering/geologicalengineering/geoe-ms)

GEOE Courses

GEOE 555. Advanced Rock Mechanics. 3 Credits.
Fundamentals of rock mechanics, elasticity theory of rock, failure criterion of rocks, laboratory and field testing methods, field instrumentation, the applications of rock mechanics in mining, tunneling and rock slopes engineering, and the applications of numerical methods in rock mechanics. Prerequisites: GEOE 323 and ENGR 203. F.

GEOE 591. Advanced Hydrocarbon Extraction in Engineering. 3 Credits.
This course describes technologies that can be applied to further recover underground energy source - oil/gas, for example, that cannot be produced by primary or second extraction. Development of these processes requires significant technological advances in our understanding of underground mining from hydrocarbon reservoirs and may be the stimulus for future technological development. Prerequisites: GEOE 301, MATH 166, MATH 266, CHEM 122, and CHEM 122L. F.

GEOE 599. Doctoral Research. 1-15 Credits.
Research contributing to the discovery and dissemination of knowledge and/or technology in Geological Engineering and contributing to the student's doctoral dissertation. Prerequisite: Admission to the PhD program in Geological Engineering. Repeatable to 15 credits. F,SS.

GEOE 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

GEOE 998. Thesis. 1-9 Credits.

GEOE 999. Dissertation. 1-18 Credits.
PhD student doctoral dissertation. Prerequisite: Admission to the PhD program in Geological Engineering. Repeatable to 18 credits. S/U grading. F,SS.

Undergraduate Courses for Graduate Credit

GEOE 323. Engineering Geology. 2 Credits.
This course is to introduce the application of geological, hydrological and environmental principles to geotechnical/geological engineering design, construction and operation as well as various geohazards. Prerequisites: One introductory geology course and MATH 165. S.

GEOE 417. Hydrogeology. 3 Credits.
Physical and chemical aspects of groundwater movement, supply, and contamination. Prerequisites: CHEM 121 or CHEM 221; MATH 166 or consent of instructor. F.

GEOE 418. Hydrogeological Methods. 2 Credits.
Field and laboratory methods used in hydrogeology; techniques of drilling, well and piezometer installation, determination of aquifer parameters, geophysical exploration, soil classification and analysis, ground water sampling and analysis. Includes field trip. Prerequisite: GEOE 417. F.

GEOE 419. Groundwater Monitoring and Remediation. 3 Credits.
Statistical methods for groundwater sampling and monitoring network design. Groundwater remediation and design, including strategies that remove contaminants for external treatment and strategies for in-situ contaminant treatment. Prerequisites: MATH 166, GEOE 417 and a statistics course (ECON 210, PSYC 241, MATH 321 or MATH 353) or consent of instructor. S.

GEOE 425. Design Hydrology for Wetlands. 3 Credits.
Principles of chemistry, geology, hydrodynamics, and hydrology applied to natural and constructed wetlands and other small catchments. Prerequisites: CHEM 121 and either CE 306/CE 306 or GEOE 417. S.

GEOE 427. Groundwater Modeling. 3 Credits.
Fundamentals of numerical modeling applied to groundwater flow. Spreadsheet calculations will be used to demonstrate the finite difference method applied to groundwater movement and storage. Simulation of practical groundwater problems will be performed with the U.S. Geological Survey's MODFLOW code. Prerequisites: GEOE 417 and MATH 265; some programming experience is recommended. On demand.

GEOE 455. Geomechanics. 3 Credits.
The objective of this course is to train the students to use fundamental principles and field and lab techniques of Rock Mechanics to analyze real-world problems, identify the optimal methods, and solve the practical geological engineering problems with the combination of field and laboratory, analytical and experimental means. Emphasis will be on the fundamental principles and their application to practical engineering problems, both surface and underground. Prerequisites: GEOE 323 or consent of instructor. F.

GEOE 493. Selected Topics in Geological Engineering. 1-3 Credits.
Detailed study of selected topics in Geological Engineering. Includes laboratory if applicable. Repeatable. Repeatable. On demand.

GEOL Courses

GEOL 500. Sedimentary Geology. 1-4 Credits.
Selected topics in sedimentary geology, such as sedimentary processes, carbonate petrology, clastic petrology, and basin analysis. May be repeated up to 12 credits. Prerequisite: Consent of instructor. Repeatable to 12 credits. F.

GEOL 505. Isotope Geochemistry. 3 Credits.
Geochemistry and cosmochemistry of radioactive and stable isotopes; isotope equilibria; applications in paleoclimatology, environmental isotope geochemistry, igneous, metamorphic, and sedimentary petrology. Prerequisite: GEOL 321 or permission of instructor.

GEOL 506. Glacial Geology. 4 Credits.
Origin, growth, and movement of glaciers; landforms and deposits incident to glaciation. 3 hours lecture, 2 hours laboratory time per week. Prerequisite: GEOL 311.

GEOL 509. Advanced Mineralogy. 1-4 Credits.
Advanced study of specific mineral groups or selected topics in mineralogy. Prerequisite: GEOL 320; recommended prerequisite GEOL 321.

GEOL 511. Advanced Structural Geology. 4 Credits.
Reading and research in special topics in structural geology and geotectonics.

GEOL 512. Advanced Petrology. 1-4 Credits.
Selected topics in petrology taught using conventional lecture and laboratory/field approach. Prerequisite: GEOL 320.

GEOL 515. Advanced Paleontology. 3 Credits.
Selected topics include (but not limited to): Invertebrate paleontology; vertebrate paleontology; paleocology; taxonomy; museum studies; western continental stratigraphy; critical boundaries. May be repeated. Prerequisites: GEOL 415, BIOL 150, or consent of instructor. Repeatable to 40 credits. On demand.

GEOL 518. Topics in Advanced Stratigraphy. 2-4 Credits.
Selected topics in lithostratigraphy and biostratigraphy. Prerequisites: GEOL 411, GEOL 415. Repeatable to 4 credits.

GEOL 520. Statistical Applications in Geology. 3 Credits.
The application of statistical techniques to geologic data and problems, with emphasis on analysis of geologic sequences, map analysis, and multivariate analysis of geologic data. Prerequisites: An introductory statistics course, such as CTL 515 or PSYC 241, and consent of instructor.

GEOL 522. History and Philosophy of Geology. 3 Credits.
Historical and philosophical development of the science of geology. Prerequisite: Permission of instructor.
GEOL 523. Topics in Advanced Geomorphology. 1-4 Credits.
Selected topics in geomorphic processes and landforms. Prerequisite: GEOL 311. Repeatable to 4 credits.

GEOL 525. Weathering and Soils. 3 Credits.
Properties and classification of soils: the factors and processes of weathering and soil formation. Prerequisite: GEOL 311 and GEOL 411, or consent of instructor.

GEOL 530. Topics in Physical Hydrogeology. 2 Credits.
Selected topics in groundwater, vadose-zone hydrology, fracture flow, analytical/numerical modeling, GIS and hydrology, and wetland soils/hydrology. Repeatable when topics vary. Prerequisite: Consent of instructor. Repeatable to 8 credits. F,S.

GEOL 531. Hydrogeochemistry. 3 Credits.
The origin, characteristics and modeling of surface and ground water geochemistry. Prerequisites: GEOL 321 and, MATH 166, or permission of instructor.

GEOL 532. Contaminant Hydrogeology. 3 Credits.
Chemical and physical processes affecting contaminant behavior in groundwater with analytical/numerical modeling and case studies. Prerequisites: GEOE 417 and GEOE 427 and MATH 265, or consent of instructor.

GEOL 540. Water Sampling and Analysis. 3 Credits.
Techniques of water and sediment sampling and analysis using equipment in the UND Water Quality Laboratory. Results are interpreted in the context of the natural systems from which the samples are taken. Enrollment is limited to eight students per section. A laboratory fee is required. Prerequisite: CHEM 121.

GEOL 551. Heat Flow. 3 Credits.
An exploration of Earth's thermal structure, thermal history and heat sources. The course begins with the theory of heat transfer within and through the surface of terrestrial planets. Methods of observation and modeling provide hands-on experience in field and laboratory activities. Applications of heat flow in tectonics, petrology, thermal maturity of kerogen, hydrogeology, geothermics and climate change are presented with current examples. Prerequisite: Graduate standing. Corequisite: Permission of instructor. On demand.

GEOL 560. Geothermics I. 3 Credits.
A survey of the methods of geothermal exploration, assessment and production. The course covers the various methods for discovery and characterization of geothermal resources. Methods for assessment of energy in place and determination of recoverable energy are covered in depth. Current technologies for energy extraction and power production are presented with current examples. Prerequisite: Graduate standing. Corequisite: Permission of instructor. On demand.

GEOL 561. Geothermics II. 3 Credits.
The course covers the historical development of geothermal policies, regulations and practices globally and in different states within the US. Matters of water usage, contamination and disposal are covered extensively. Current issues such as induced seismicity, hydrofracture, power plant size and location, electrical grid access and land use are critically examined. Prerequisite: Senior or Graduate Standing. Corequisite: Permission of Instructor. On demand.

GEOL 590. Research. 1-4 Credits.
Directed advanced research in a specialized field of geologic study (may be repeated). Repeatable.

GEOL 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

GEOL 997. Independent Study. 2 Credits.

GEOL 998. Thesis. 1-9 Credits.
Repeatable to 9 credits.

GEOL 999. Dissertation. 2-12 Credits.
May be repeated up to 24 credits. Repeatable to 24 credits.

Undergraduate Courses for Graduate Credit

GEOL 311. Geomorphology. 4 Credits.
Dynamics of weathering, mass movement, running water, groundwater, waves, wind and ice in the production of landforms. Includes field trips and laboratory. Prerequisites: GEOL 101 or GEOE 203; MATH 165, PHYS 211, CHEM 121 or consent of instructor. F.

GEOL 320. Petrology. 3 Credits.
Description, classification and origin of igneous, metamorphic, and sedimentary rocks. Field and laboratory study of rocks. Engineering properties of earth materials. Advanced aspects of optical mineralogy. Includes laboratory. Prerequisite: GEOL 318. F.

GEOL 321. Geochemistry. 3 Credits.
Application of the principles of chemistry to geologic and hydrogeologic problems. Origin and distribution of the chemical elements. Introduction to radiochemistry, isotopic geochronology, and stable-isotope geochemistry. Prerequisites: GEOL 318, CHEM 122, and MATH 165 or consent of instructor. S.

GEOL 340. Digital Mapping Methods. 3 Credits.
This course integrates "hands-on" data acquisitions and map generation with an overview of the technology (GPS, lasers, and data management). Field projects focus on mapping methodology and laboratory projects focus on analysis and presentation. It is assumed that students have an undergraduate geology background and a basic knowledge of computer applications. Prerequisite: Junior Standing in geology.

GEOL 407. Petroleum Geology. 3 Credits.
Origin, accumulation and geologic occurrence of petroleum and gas. Prerequisites: GEOL 101 or GEOE 203, and GEOL 102. F, odd years.

GEOL 411. Sedimentology and Stratigraphy. 5 Credits.
Origin, transportation, deposition, and diagenesis of sediments; principles and applications of stratigraphy. Includes field trip and laboratory. Prerequisite: GEOL 320. S.

GEOL 414. Applied Geophysics. 3 Credits.
Principles of various geophysical methods and their application to geologic problems. Prerequisites: GEOL 101 or GEOE 203; MATH 165; and PHYS 211 or 251. F.

GEOL 415. Introduction to Paleontology. 4 Credits.
The principles of paleontology/paleobiology are presented using fossils to document the evolutionary, stratigraphic, and paleoecologic history of animal and plant life on Earth. Includes field trip and laboratory. Prerequisites: GEOL 102; BIOL 150 and BIOL 151 are recommended prerequisites. F, even years.

GEOL 422. Seminar II. 1 Credit.
Continuation of GEOL 421 experience. Preparation and delivery of oral presentations in science and engineering, culminating in oral presentation of senior thesis (Geol 490) or Engineering Design (485). Includes critical review of student presentations and departmental guest lectures. Prerequisites: GEOL 421, senior or graduate status in departmental major. F.S.

Doctor of Philosophy in Geology

Admission Requirements

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. For admission to the geology Ph.D. program, applicants must hold a bachelor’s degree in geology from an accredited college or university or otherwise demonstrate sufficient coursework, training, or experience in geoscience.

2. For “approved” status, students must have completed a 5-6 credit hour geology field course, along with satisfactory achievement in supporting science and mathematics, as determined by the department graduate admissions committee.

3. For all graduate programs in the Department of Geology and Geological Engineering, a cumulative 3.0 or higher grade point average is required.

4. Submission of a Graduate Record Examination (GRE) general test score is strongly recommended if you do not have a degree in geology. Applicants are encouraged to submit their GRE score to support their application.
5. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

Students missing any of the above requirements may be admitted under provisional or qualified status, but all admission requirements must be completed, without graduate credit, within one year after beginning graduate work.

Initial decisions for admission and financial aid are made about March 1 for the fall semester and about September 1 for the spring semester.

**Degree Requirements**

Students seeking the Doctor of Philosophy degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Geology and Geological Engineering Department.

Students normally take the equivalent of three years of full-time work beyond the master’s degree for the doctorate.

1. Completion of 90 semester credits beyond the baccalaureate degree.
2. Maintenance of at least a 3.0 GPA for all classes completed as a graduate student.
3. With approval of a student’s Faculty Advisory Committee, up to one-half of the work beyond a master’s degree (maximum of 30 semester credit hours) may be transferred from another institution that offers post-master’s degrees in the discipline.
4. A qualifying examination may be required before the end of the student’s first year in a doctoral program.
5. Demonstration of:
   a. proficiency in two foreign languages, or
   b. proficiency in one foreign language and two scholarly tools courses, or
   c. proficiency in four scholarly tools courses (scholarly tools courses typically are advanced undergraduate courses in related fields in mathematics, science, or engineering).
6. Completion of a dissertation, which incorporates independent work that is an original contribution to knowledge.

**Master of Arts in Geology**

**Admission Requirements**

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. For admission to the geology M.A. program, applicants must hold a bachelor’s degree in geology from an accredited college or university or otherwise demonstrate sufficient coursework, training, or experience in geoscience.
2. Applicants may be admitted under “provisional” or “qualified” status, but to advance to “approved” status, they must have completed 5 to 6 credit hours of geology field course, or its equivalent, along with satisfactory achievement in supporting sciences and mathematics, as determined by the Harold Hamm School of Geology and Geological Engineering’s Graduate Admissions Committee.
3. Applicants must have a cumulative grade point average of 3.0 or higher.
4. Applicants are encouraged to submit their GRE score to support their application, especially if they do not have an undergraduate degree in geology.
5. Applicants must satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.
6. For a Master of Arts degree, students must complete two or more semesters of calculus while an undergraduate or graduate student.

Students missing any of the above requirements may be admitted under provisional or qualified status, but all admission requirements must be completed, without graduate credit, within one year after beginning graduate work.

Initial decisions for admission and financial aid are made about March 1 for the fall semester and about September 1 for the spring semester.

To encourage undergraduate geology students to extend their studies to include a graduate degree, the College of Engineering and Mines has a combined program that permits students to earn both a bachelor’s (B.S.) and a master’s (M.A.) degree in geology. This program allows students to designate two three-credit graduate courses to count for both degrees. The selected courses must have graduate course standing and be designated when a student requests admission to the program.

Students may be admitted to the Combined Degree program if they have:

1. Completed 95 credit hours towards the bachelor’s degree.
2. Completed 30 credit hours of coursework and 8 credit hours of upper division coursework in the geological sciences, including the equivalent of physical and historical geology.
3. Maintained an overall GPA of at least 3.0 in all geological sciences they took.
4. Completed an application to the UND School of Graduate Studies and been accepted for admission.

Once admitted to the Combined Degree Program, undergraduate students are eligible to take 500-level courses for graduate credit. Students must complete the petition titled, “Graduate Credit as an Undergraduate Student” prior to registering for the courses. Such courses could be included in the 30 credit hours for the degree and could appear in the program of study.

Students in the Combined Degree Program will be admitted to the School of Graduate Studies on completion of 125 credit hours for the bachelor’s degree.

The time normally needed to complete the Combined Degree Program is 1 year, plus an additional summer after admission to the Graduate School.

**Degree Requirements**

Students seeking the Master of Arts degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as the following particular requirements set forth by the Harold Hamm School of Geology and Geological Engineering.

1. Students must complete a program of study that includes a minimum of 30 credit hours, including the credits granted for the thesis and the research leading to the thesis.
2. A maximum of 7 credit hours required for the degree may be transferred from another institution.
3. A minimum of 6 credit hours (undergraduate or graduate) must come from each subject area listed below:
   a. mineralogy, petrology, geochemistry
   b. sedimentology, stratigraphy, paleontology, geomorphology
   c. structural geology, geophysics, hydrogeology
4. Up to 12 credit hours of 300-400 level coursework in geology may be taken for graduate credit.

The time normally needed to complete the requirements for the master’s degree in geology is about two years of full-time work. Students with graduate teaching or research assistantships may need more time.

**Master of Science in Geology**

**Admission Requirements**

The applicant must meet the School of Graduate Studies’ current minimum general admission requirement as published in the graduate catalog.

1. For admission to the geology M.S. program, applicants must hold a bachelor’s degree in geology from an accredited college or university or otherwise demonstrate sufficient coursework, training, or experience in geoscience.
2. Applicants may be admitted under “provisional” or “qualified” status, but to advance to “approved” status, they must have completed 5 to 6 credit hours of geology field course, or its equivalent, along with satisfactory achievement in supporting sciences and mathematics, as determined by the Harold Hamm School of Geology and Geological Engineering's Graduate Admissions Committee.
3. Applicants must have a cumulative grade point average of 3.0 or higher.
4. Applicants are encouraged to submit their GRE score to support their application, especially if they do not have an undergraduate degree in geology.
5. Applicants must satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.
6. For a Master of Science degree, students must complete 2 semesters of calculus, plus an additional calculus or relevant math, computer programming, or statistical class, while an undergraduate or graduate student.

Students missing any of the above requirements may be admitted under provisional or qualified status, but all admission requirements must be completed, without graduate credit, within one year after beginning graduate work.

Initial decisions for admission and financial aid are made about March 1 for the fall semester and about September 1 for the spring semester.

To encourage undergraduate geology students to extend their studies to include a graduate degree, the College of Engineering and Mines has a Combined Program that permits students to earn both a bachelor’s (B.S.) and a master’s (M.S.) degree in Geological Engineering. This program allows students to designate two three-credit graduate courses to count for both degrees. The selected courses must have graduate course standing and be designated when a student requests admission to the program.

Students may be admitted to the Combined Degree Program if they have:
1. Completed 95 credit hours towards the bachelor’s degree.
2. Completed 30 credit hours of coursework and 8 credit hours of upper division coursework in the geological sciences, including the equivalent of physical and historical geology.
3. Maintained an overall GPA of at least 3.0 in all geological sciences they took.
4. Completed an application to the UND Graduate School and been accepted for admission.

Once admitted to the Combined Degree Program, undergraduate students are eligible to take 500-level courses for graduate credit. Students must complete the petition titled, “Graduate Credit as an Undergraduate Student” prior to registering for the courses. Such courses could be included in the 30 credit hours for the degree and could appear in the program of study.

Students in the Combined Degree Program will be admitted to the School of Graduate Studies on completion of 125 credit hours for the bachelor’s degree.

The time normally needed to complete the Combined Degree Program is 1 year, plus an additional summer after admission to the Graduate School.

Degree Requirements

Students seeking the Master of Science degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies, as well as the following particular requirements set forth by the Harold Hamm School of Geology and Geological Engineering:

1. Students must complete a program of study that includes a minimum of 30 credit hours, including the credits granted for the thesis and the research leading to the thesis.
2. At least 15 credit hours must be for classes at or above the 500-level.
3. A maximum of 7 of the credit hours required for the degree may be transferred from another institution.
4. A minimum of 6 credit hours (undergraduate or graduate) must come from each subject area listed below:
   a. Mineralogy, petrology, geochemistry
   b. Sedimentology, stratigraphy, paleontology, geomorphology
   c. Structural geology, geophysics, hydrogeology
5. Up to 12 credit hours of 300-400 level coursework in geology may be taken for graduate credit.

The time normally needed to complete the requirements for the master’s degree in geology is about two years of full-time work. Students with graduate teaching or research assistantships may need more time.

History

M.A. in History (p. 467)
D.A. in History (p. 465)
Ph.D. in History (p. 466)

Courses

HIST 501. Methods of Historical Research. 3 Credits.
This course is intended to teach graduate students to comprehend, analyze, apply, and evaluate the basic techniques and frameworks for historical research. These include basic historical theories, methods, and problems (such as causality, objectivity, types of evidence, schools of historical thought, evaluation of sources, qualitative and quantitative analysis). Students will also learn how to use standard databases and bibliographical aids to find, identify, and assess appropriate information to support, modify, or reject historical interpretations and arguments. Prerequisite: Graduate status.

HIST 502. Historiography. 3 Credits.
Required for all candidates for advanced degrees in history. An introduction to the history of historical thought, from the classical Greeks to the present, with examination of some of the works of important historians writing in the western tradition. The first half of the course is primarily devoted to classical and European historians; the second half is primarily devoted to modern and American historians.

HIST 503. Advanced Historical Methods. 3 Credits.
This course introduces students to a specific historical research methodology through instruction and practice. Repeatable up to 6 credits. Repeatable to 6 credits.

HIST 511. Research Seminar in American History. 3 Credits.
Required for all candidates for the Doctor of Philosophy, Doctor of Arts, and Master of Arts who do not take History 515. This course requires preparation of a research paper. The subject of the research will be within an announced general topic area of American History. Repeatable. Repeatable.

HIST 513. Research Seminar in World History. 3 Credits.
This course introduces students to the research and writing of World History with a stress on the proper utilization of comparative and thematic methodology. It requires the preparation of a research paper that utilizes the methodology of World History.

HIST 515. Research Seminar in European History. 3 Credits.
Required for all candidates for the Doctor of Philosophy, Doctor of Arts, and Master of Arts who do not take History 511. This course requires preparation of a research paper. The subject of the research will be within an announced general topic area of European History. Repeatable. Repeatable.

HIST 520. Material Culture. 3 Credits.
This course introduces students to a material culture research methodology through reading, discussion, research, and writing.

HIST 521. Public History. 3 Credits.
This course exposes students to the practice of public history through readings, discussion and practice. Repeatable to six credits. Repeatable to 6 credits.

HIST 551. Seminar in the Teaching of History. 3 Credits.
Required of all students pursuing the Doctor of Philosophy and Doctor of Arts. Includes methods appropriate to college-level teaching. Class consists of discussion, demonstration, and practice. S.

HIST 585. Directed Readings. 3 Credits.
Independent, directed readings on a topic tailored to the individual needs of the student. Doctoral students may repeat this course to a maximum of 6 credits; Masters students may not repeat the course. Prerequisite: Graduate status.

HIST 592. Readings in World History. 3 Credits.
This course focuses upon the reading and understanding of World History historiography, theories and methods through thematic and comparative readings. Repeatable. Repeatable.
HIST 593. Readings in American History. 2-3 Credits.
Topics vary. Involves reading, bibliographical study, discussion, and writing. Study may be confined to a subtopic within the general subject area. Repeatable with different subtopics. Students in the M.A. program with a U.S. primary concentration will not ordinarily take more than one 593. Repeatable to 30 credits.

HIST 594. Readings in European History. 2-3 Credits.
Topics vary. Involves reading, bibliographical study, discussion, and writing. Study may be confined to a subtopic within the general subject area. Repeatable with different subtopics. Students in the M.A. program with a European primary concentration will not ordinarily take more than one 594. Repeatable to 36 credits.

HIST 595. Research. 1-6 Credits.
Requires a research project that will be a component of the area of concentration. Repeatable to 12 credits. Prerequisite: Candidates for the Doctor of Arts only. Repeatable to 12 credits.

HIST 599. Internship in the Teaching of History. 3 Credits.
The internship requires the teaching of three courses to demonstrate proficiency in college-level teaching at the undergraduate level. Although the teaching is supervised, the student has full responsibility for the courses. The internship may be conducted on this campus or, with proper arrangement and supervision, on another campus. May be repeated to a maximum of nine credits. Prerequisite: Candidates for the Doctor of Arts only. Repeatable to 9 credits. S/U grading.

HIST 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

HIST 997. Independent Study. 2 Credits.
Repeatable to 6 credits.

HIST 999. Thesis. 1-6 Credits.
Repeatable to 6 credits.

Undergraduate Courses for Graduate Credit

HIST 344. Ancient Rome. 3 Credits.
A survey of the prehistory, historical development, and ultimate decline in Rome. In addition to inquiries into the military, political, cultural, economic, and religious experiences of the ancient Romans, this course will attempt to delineate those qualities of life that were peculiarly Roman. S, even years.

HIST 405. The United States: Age of Jefferson and Jackson, 1789-1850. 3 Credits.
A study of the creation of a new, expansive nationalism in the development of new institutions and new national character, and the simultaneous growth of sectional forces which brought the new nation to the brink of Civil War. F, even years.

HIST 406. The United States: Civil War and Reconstruction, 1850-1877. 3 Credits.
A study of the acceleration of the forces of sectionalism and racism that caused the temporary breakdown of the American democratic process and the tragedy of Civil War and Reconstruction. S, odd years.

HIST 407. The United States: Rise of Industrial America, 1877-1917. 3 Credits.
A survey of the rise of America to industrial and world power. Emphasis is placed upon the great changes which the Industrial Revolution brought and the American response to these changes. Detailed attention is given to the Populist and Progressive movements. F, odd years.

HIST 408. The United States, 1920-1945. 3 Credits.
A study of American society from the end of World War I through World War II. Emphasis will be placed upon the Republican ascendancy and social changes during the 1920s, the causes of the Great Depression, the New Deal, the road to World War II, and the war, especially the homefront. F, odd years.

HIST 412. U.S.Foreign Relations since 1900. 3 Credits.
An advanced survey of the major policies advocated and pursued by the U.S. during the 20th century. S, odd years.

HIST 413. The United States since 1945. 3 Credits.
An advanced examination of the United States as it has developed from the height of its power, influence, and prosperity through years of upheaval, cultural and political transformation, and economic decline. F, even years.

HIST 419. Great Britain since 1815. 3 Credits.
A survey of British history since 1815 with an emphasis on the state of mind known as "Victorian," as it was manifested, practiced, or criticized in the nineteenth century; its influence on economics, politics, foreign affairs, and social policy; and its vestiges in modern-day Britain. F, even years.

HIST 431. Seminar in the History of the Great Plains. 3 Credits.
This course promotes focused study of the Great Plains of North America through reading, discussion, research, and writing. Students will examine all aspects of Great Plains history including culture, environment, social organization, economics, and politics from the ancient past to the present. S, odd years.

HIST 470. United States-Canadian Relations, 1776 to the Present. 3 Credits.
This course explores the historical relationships linking and dividing Canada and the United States of America since 1774. Because of the unique constitutional and diplomatic status of British North America and then Canada itself, this course examines the often complex tri-partite relationship between the U.S., Canada, and Great Britain. F, even years.

HIST 480. Introduction to Public History. 3 Credits.
An introduction to public history at federal, state, and local levels. Emphasis is given to archival theory, oral history, museum studies and historic preservation, with attention to awareness of historical resources. On demand.

HIST 481. Public History Practice. 3 Credits.
A practicum in which the student learns through experience the techniques of public history work. S, odd years.

Doctor of Arts in History

Admission Requirements

The applicant must meet the School of Graduate Studies’s current minimum general admission requirements as published in the graduate catalog.

1. All M.A. admission requirements.
2. A master’s degree, preferably in history and with thesis, but at least 15 semester credits of history at the graduate level.
3. A GPA of at least 3.50 for the master’s level work.
4. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.
5. Preference will be given to applicants with teaching experience, especially in the fields of history, the social sciences, or the humanities.
6. To insure full consideration of applications, especially for tuition waivers and graduate teaching assistantships, the application deadline for Fall admission is March 15 and for Spring admission it is September 30. Later applications will be considered.

Degree Requirements

Students seeking the Doctor of Arts degree at the University of North Dakota must satisfy all general requirements of the School of Graduate Studies as well as specific requirements of the History Department.

1. Completion of 90 semester credits beyond the baccalaureate degree, including acceptable master’s work.
2. The following coursework:
   - HIST 501 Methods of Historical Research 3
   - HIST 502 Historiography 3
   - HIST 551 Seminar in the Teaching of History 3
   - Select one of the following (research seminar): 3
     - HIST 511 Research Seminar in American History
     - HIST 513 Research Seminar in World History
     - HIST 515 Research Seminar in European History
   - Select two of the following (reading courses): 6
     - HIST 592 Readings in World History
     - HIST 593 Readings in American History
     - HIST 594 Readings in European History

Total Credits 18
3. An area of concentration in one of the following fields: U.S. History to 1877, U.S. History since 1877, Pre-Modern European/Mediterranean History to 1750, Modern European History, World History. The concentration will include:
   a. 12 elective graduate credits in the field of concentration.
   b. HIST 595 Research (12 credits). An independent research project exploring a topic of significant concern to historians and teachers of history.
4. The following coursework:
   T&L 539 College Teaching 3
   Select one of the following: 3
   PSYC 501 Psychological Foundations Educ
   T&L 544 Assessment in Higher Education
   T&L 545 Adult Learners
   T&L 547 Technology in Higher Education
   Total Credits 6
5. HIST 599 Internship in the Teaching of History (9 credits). Students will generally assist and co-teach a 100 level survey course with an experienced faculty mentor in the first semester of the internship; in two following semesters the student will teach two of the following independently:
   HIST 101 Western Civilization I 3
   HIST 102 Western Civilization II 3
   HIST 103 United States to 1877 3
   HIST 104 United States since 1877 3
   HIST 105 World Civilizations I 3
   HIST 106 World Civilizations II 3
6. Written examinations in both United States fields and in two of the three European fields selected on the basis of work done in a Master’s degree program as well as the doctoral program. (Exams may be taken after 60 hours of the program of study have been completed.)

Doctor of Philosophy in History Combined Program with NDSU

Admission Requirements
The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.
1. Preference for admission into the Ph.D. program with full graduate standing will be given to applicants who have a GPA of at least 3.5 in history courses in an earned bachelor’s or master’s degree.
2. Applicants will submit a statement of intent clearly outlining the applicant’s research interests, career goals, and purpose for seeking a Ph.D. in history.
3. Applicants will submit a substantial paper previously submitted for a class in history to provide evidence of ability to research thoroughly, to interpret and analyze primary and secondary sources, to synthesize information, to organize thoughts logically, and to communicate clearly and effectively.
4. Scores on the Graduate Record Examination are required.
5. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

Degree Requirements
Students seeking the Doctor of Philosophy degree at the University of North Dakota must satisfy all general requirements of the School of Graduate Studies as well as specific requirements of the History Department.
1. Students must satisfactorily complete 90 credits beyond the bachelor’s degree. Students entering with an M.A. degree must complete at least 60 additional semester graduate credits. Core course requirements must be met which include: Methods of Historical Research, Historiography, Seminar in the Teaching of History, at least two research seminars, and at least two readings courses. Students must complete 36 course credits with at least 27 credits in history courses. Students will earn 12 credits in two or more major fields. Students may choose a third major field or a minor field (nine semester credits).
2. Students must have a proficiency in two languages other than their native language or one foreign language and one special research skill such as statistics or computer science.
3. The program will require at least one academic year in residence at either campus. Each student will register at one of the universities that will be the student’s academic “home.” The student’s adviser must be employed in the home university. At least one member of the student’s committee must be employed at the other (not home) university. Students may have to take courses at both universities.
4. Students will write three comprehensive examinations in their major and minor fields. The exams will be read and graded by the supervisory committee. Students will complete an oral examination based on the written exams. The oral examination is to be conducted by the supervisory committee.
5. Students will write a dissertation (up to 24 credits) on an approved topic in consultation with the faculty adviser and the supervisory committee of five faculty. The dissertation must be based on extensive research in primary and secondary sources, must argue an original thesis, and must be defended before the supervisory committee.
6. The committee will be composed of the faculty adviser who represents the student’s field of study and who will direct the research and writing of the dissertation. A second member of the committee (second reader) represents the student’s major field of study. A third member of the committee will represent the student’s minor field of study. The fourth member of the committee represents either the student’s major field or minor field. At least one of the four history faculty must be from the cooperating (non-home) university. The School of Graduate Studies will appoint the fifth member of the committee.

Residency Requirements
1. Students enrolled in the Ph.D. program are required to complete at least one academic year (18 credits minimum) in residence at one campus.
2. Resident students may qualify for teaching assistantships. Students who have completed a M.A. degree may be assigned full responsibility for undergraduate courses or may be assigned to assist a faculty member in teaching courses.
3. Students will be required to take some courses from faculty at both campuses, but will register at only one university. Some courses will be offered by interactive video network, some will be offered through internet online systems, some courses will require students to travel to the other campus.
4. Students not residing on one of the cooperating campuses will have to have access to a satisfactory research library for various courses and for dissertation research.

Courses
‡ All 593 and 594 courses involve reading, bibliographical study, discussion, and writing. Study may be confined to a subtopic within the general subject area. Repeatable with different subtopics. Students in the M.A. program will not ordinarily take more than one 593 or 594 in the primary concentration.

The following undergraduate courses are eligible for inclusion on graduate programs of study. Additional assignments and higher standards of accomplishment are required of students taking these courses for graduate credit.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIST 344</td>
<td>Ancient Rome</td>
<td>3</td>
</tr>
<tr>
<td>HIST 405</td>
<td>The United States: Age of Jefferson and Jackson, 1789-1850</td>
<td>3</td>
</tr>
<tr>
<td>HIST 406</td>
<td>The United States: Civil War and Reconstruction, 1850-1877</td>
<td>3</td>
</tr>
<tr>
<td>HIST 407</td>
<td>The United States: Rise of Industrial America, 1877-1917</td>
<td>3</td>
</tr>
<tr>
<td>HIST 408</td>
<td>The United States, 1920-1945</td>
<td>3</td>
</tr>
<tr>
<td>HIST 412</td>
<td>U.S.Foreign Relations since 1900</td>
<td>3</td>
</tr>
<tr>
<td>HIST 413</td>
<td>The United States since 1945</td>
<td>3</td>
</tr>
<tr>
<td>HIST 419</td>
<td>Great Britain since 1815</td>
<td>3</td>
</tr>
<tr>
<td>HIST 431</td>
<td>Seminar in the History of the Great Plains</td>
<td>3</td>
</tr>
</tbody>
</table>
Thesis Option

as requirements of the History Department. Students seeking the Master of Arts degree at the University of North Dakota must satisfy all general requirements of the School of Graduate Studies as well as admission requirements as published in the graduate catalog.

Admission Requirements

The applicant must meet the Graduate School’s current minimum general admission requirements as published in the graduate catalog.

1. Demonstration of preparation for graduate study in history. This includes one of the following from a recognized college or university:
   a. A bachelor’s degree in history, or
   b. An undergraduate degree with a minimum of 20 semester credits in history with at least 6 credits at the upper division level, or
   c. An undergraduate degree or combination of classes clearly demonstrating the applicant’s ability to pursue graduate study in history.

2. An overall undergraduate GPA of at least 3.00 and at least 3.25 in all undergraduate history courses.

3. A writing sample, preferably a research or seminar paper, that demonstrates the applicant’s research, analytical and writing skills.

4. Three letters of recommendation with at least two coming from individuals who hold or have held academic positions and who can comment on the applicant’s aptitude for graduate work.

5. A one-to-two page statement that explains the applicant’s interest in history, the reason for applying to the UND graduate program, and the student’s aptitude for graduate study.

6. The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

7. To insure full consideration of applications, especially for tuition waivers and graduate teaching assistantships, the application deadline for Fall admission is March 15 and for Spring admission, it is September 30. Later applications will be considered.

Degree Requirements

Students seeking the Master of Arts degree at the University of North Dakota must satisfy all general requirements of the School of Graduate Studies as well as requirements of the History Department.

Thesis Option

1. The M.A. degree (thesis option) requires a minimum of 30 credit hours.

2. In consultation with a designated advisor, the student will select a supervisory committee and prepare a program of study that provides the student with the academic tools necessary for advanced scholarly research, responds to the student’s academic and professional interests and goals, and fulfills all degree requirements. At the discretion of the student’s advisor, this program may require demonstrable proficiency in a foreign language, and may include a minor or cognate.

3. The following coursework is required:

   - HIST 501 Methods of Historical Research 3
   - HIST 502 Historiography 3
   - Select one of the following (research seminar): 3
     - HIST 511 Research Seminar in American History
     - HIST 513 Research Seminar in World History
     - HIST 515 Research Seminar in European History
   - Select two of the following (reading courses): 6
     - HIST 592 Readings in World History
     - HIST 593 Readings in American History
     - HIST 594 Readings in European History
   - Electives 9
   - HIST 998 Thesis 6

   Total Credits 30

4. The candidate will successfully complete, defend and submit to the School of Graduate Studies a thesis that meets the History Department’s established guidelines.

Non-Thesis Option

1. The M.A. degree (non-thesis option) requires a total of 35 credit hours.

2. In consultation with a designated advisor, the student will select a supervisory committee and prepare a program of study that provides the student with the academic tools necessary for advanced scholarly research, responds to the student’s academic and professional interests and goals, and fulfills all degree requirements. At the discretion of the student’s advisor, this program may require demonstrable proficiency in a foreign language, and may include a minor or cognate.

3. The following coursework is required:

   - HIST 501 Methods of Historical Research 3
   - HIST 502 Historiography 3
   - Select two of the following (research seminar): 6
     - HIST 511 Research Seminar in American History
     - HIST 513 Research Seminar in World History
     - HIST 515 Research Seminar in European History
   - Select two of the following (reading courses): 6
     - HIST 592 Readings in World History
     - HIST 593 Readings in American History
     - HIST 594 Readings in European History
   - Electives 15
   - HIST 997 Independent Study (see #4 below) 2

   Total Credits 35

* With the approval of the student’s advisor, up to twelve of these credits may be taken within the minor or cognate.

4. The candidate will successfully complete a scholarly independent investigation of a topic chosen in consultation with the advisor and members of the supervisory committee.

5. The candidate will successfully complete a comprehensive written examination administered by the advisor and supervisory committee, responding to the student’s program of study.

Kinesiology and Public Health Education

M.S. in Kinesiology (p. 468)

Courses

KIN 501. Introduction to Research in Kinesiology. 4 Credits.
The study of quantitative and qualitative research methods used in the field of kinesiology.

KIN 502. Evaluation in Kinesiology. 3 Credits.
The course will deal with the determination of standards for human performance in kinesiology, and the principles to apply these standards for exercise prescription.

KIN 511. Theory and Practice in Administration. 2 Credits.
A study of the knowledge, skills and insights as they relate to planning, management and leadership necessary for effective administration of programs. Prerequisite: KIN 341 or consent of instructor.

KIN 512. Theory and Practice in Sports Administration. 2 Credits.
Problems, policies and facilities in athletic departments with emphasis on the secondary level. Public relations problems met and problems of interrelationships with the general curriculum.

KIN 513. Supervision of Teaching and Coaching in Sports and Fitness Education. 3 Credits.
The study of the knowledge and skills necessary to supervise teaching and coaching in sport and fitness education. Prerequisite: KIN 521 or consent of instructor.
KIN 514. Theory and Practice in Intramural Sports Administration. 2 Credits.
Study of the basic ingredients required to administer a successful intramural program.

KIN 520. Curriculum Development for Physical Education. 3 Credits.
A study of processes for planning, implementing, and evaluating curriculum in physical education.

KIN 521. Analysis of Teaching and Coaching. 3 Credits.
A review of the knowledge and skills for instruction of physical activity and sports, with practical applications to teaching and coaching.

KIN 523. Historical and Philosophical Foundations. 2 Credits.
Educational justification of various phases of the kinesiology based on historical and philosophical evidence.

KIN 524. Adapted Activities. 3 Credits.
Theory and practice of modified activities adapted to needs, capacities and abilities of the atypical child. Prerequisite: KIN 404 or consent of instructor.

KIN 525. Motor Development. 3 Credits.
Study of age-related performance changes across the life span. Emphasis will be on physical and mental change as they affect motor skill acquisition and performance. Prerequisite: KIN 276 or KIN 355 or consent of instructor.

KIN 526. Introduction to Kinesiology Statistics. 3 Credits.
Understanding, interpreting, and reporting results of basic statistical analyses (descriptive and inferential, up to and including factorial and repeated measures ANOVAs) used in kinesiology research. Prerequisite: Kinesiology major or consent of instructor.

KIN 529. Exercise Psychology. 3 Credits.
A research-based study of the psychological aspects that are associated with participation in exercise/physical activity. Prerequisite: KIN 440 or consent of instructor.

KIN 530. Sports Biomechanics. 3 Credits.
The application of principles of mechanics to the study of human motion. F, even years.

KIN 531. Sport Psychology. 3 Credits.
A research-based study of the psychological aspects associated with participation in sport. Prerequisite: KIN 440 or consent of instructor.

KIN 532. Strength and Power Testing Techniques and Programming. 3 Credits.
Focuses on laboratory and field tests common in strength and power assessment. Prerequisite: KIN 402. F.

KIN 533. Motor Learning and Control. 3 Credits.
Study of the acquisition and control of human motor skill. Prerequisite: KIN 276 or equivalent or consent of instructor.

KIN 534. Sport Sociology. 3 Credits.
This course is designed to examine various sociological factors in American society and their relationship to the sport experience. Prerequisite: KIN 401 or consent of instructor.

KIN 535. Advanced Exercise Physiology I. 3 Credits.
The focus of this course is on the mechanisms which affect the cardiovascular and pulmonary system responses at rest, during and after exercise. Prerequisites: KIN 402 or equivalent and consent of instructor.

KIN 536. Bioenergetics and Skeletal Muscle Function. 3 Credits.
Focuses on acute and chronic muscle function, energy metabolism, and regulatory process of skeletal muscle and muscle cell function during rest, during exercise and during recovery. Prerequisites: KIN 402 or equivalent, and consent of instructor. F.

KIN 537. Applied Sport Psychology. 3 Credits.
A study of psychological skill training programs for use with team and individual sports athletes. Prerequisite: KIN 440 or consent of instructor.

KIN 538. Exercise in Health and Disease. 3 Credits.
The role of exercise in the prevention and rehabilitation of individuals in various disease states (e.g., atherosclerosis, chronic obstructive lung disease, hypertension, diabetes, osteoporosis, obesity, and others) and health states (e.g., aging and pregnancy). This is a lecture course. Prerequisite: KIN 535 or consent of the instructor.

KIN 539. Ex Phys Lab: Anthropometry and Body Composition. 3 Credits.
Designed to develop practical and hands-on skills in anthropometry (the science of measuring body size, shape and composition) for apparently healthy individuals of all ages. Prerequisite: Consent of instructor. S.

KIN 540. Teaching Lifetime Fitness. 3 Credits.
A study of the philosophical, disciplinary, and professional considerations that are necessary for the optimal planning and execution of lifetime fitness/wellness education programs in public schools and allied settings.

KIN 541. Exercise Program Design. 3 Credits.
Focuses on designing scientifically sound aerobic, strength and conditioning, and resistance training programs for healthy adults. Intended for students planning on coaching, strength conditioning coaching, personal training, corporate fitness, exercise physiology, law enforcement, military, athletic training, or the allied health professions (physical therapy, etc.). S.

KIN 555. Special Topics in Kinesiology. 1-4 Credits.
Investigation of special topics in the study of kinesiology not included in current departmental course offerings. Repeatable when topics differ. Repeatable.

KIN 560. Seminar in Kinesiology. 1 Credit.
Presentations of current topics based on reviews of literature. Repeatable to 4 credits. Prerequisite: Consent of instructor. Repeatable to 4 credits. S/U grading.

KIN 561. Critical Synthesis and Analysis in Kinesiology. 2 Credits.
This course is designed to provide the student with the opportunity to critically analyze and synthesize selected topics in kinesiology. Prerequisite: 20 hours of graduate credit.

KIN 565. Internship in Kinesiology. 3-6 Credits.
Professional experience and skill development through supervised placement at an approved work site (or other program) relevant to the course of study. Repeatable to 6 credits. Prerequisites: Appropriate foundational and major area coursework and consent of advisor and on-site supervisor. Repeatable to 6 credits.

KIN 590. Individual Research in Kinesiology. 1-4 Credits.
Library, laboratory or field research of an approved project in Kinesiology. Repeatable to 4 credits. Prerequisites: KIN 501 and consent of the student's faculty advisor. Repeatable to 4 credits.

KIN 592. Directed Readings in Kinesiology. 2-3 Credits.
Extensive readings to cover a student's area of specialization and interest; written reports are required (may be repeated to a total of six credits). Prerequisites: KIN 501 and consent of the student's faculty advisor. Repeatable to 6 credits.

KIN 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

KIN 997. Independent Study. 2 Credits.

KIN 998. Thesis. 1-9 Credits.
Minimum of 4 credits for thesis option. Repeatable to 9 credits. F.S.SS.

**Master of Science in Kinesiology**

**Admission Requirements**

Applicants who are seeking admission to the Kinesiology program in School of Graduate Studies must:

1. Meet all of the minimum general School of Graduate Studies admission requirements identified in the graduate catalog;
2. Include a personal statement of research interests and professional goals, which will be used to evaluate the potential for success in the graduate program and the adequacy and appropriateness of undergraduate/professional preparation.

**Degree Requirements**

Students seeking the Master of Science degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Kinesiology Graduate Program.

**Thesis Option (minimum 30 credits):**

1. Completion of 20 credits from Kinesiology.
2. Completion of graduate level courses in research methods and statistics (minimum of 6 credits).
3. Completion of KIN 560 every semester (repeatable for 1-4 credits).
4. Establish the Faculty Advisory Committee and submit the Program of Study by the completion of nine graduate credits.
5. Complete thesis (LING 998, 6-9 credits).

Non-Thesis Option (minimum 32 credits):
1. Completion of 20 credits from Kinesiology.
2. Completion of graduate level courses in research methods and statistics (minimum of 6 credits).
3. Completion of KIN 560 every semester (repeatable for 1-4 credits).
4. Select permanent advisor and submit the Program of Study by the completion of nine graduate credits.
5. Complete independent study (LING 997, 2 credits)
6. Pass final comprehensive examination.

Linguistics

M.A. in Linguistics (p. 471)

Certificate in Community-Based Literacy as Applied Linguistics (p. 470)

Courses

LING 502. Acoustic Phonetics. 3 Credits.
This course focuses on the instrumental study of the acoustic properties of speech sounds, speech analysis, experimental techniques, and laboratory work. By the end of the course, students should be confident in their abilities to plan, carry out and analyze the results of experiments in phonetics; and to relate acoustic phonetic data to their linguistic analyses. Basic techniques in experimental phonetics such as recording, annotation, fundamental frequency analysis, formant frequency analysis, and spectrographic analysis will be studied. Prerequisite: LING 450. Prerequisite or Corequisite: LING 451.

LING 503. Phonology II. 3 Credits.
Phonological phenomena examined from current theoretical frameworks; emphasis on creation and testing of hypotheses about the phonological systems of particular languages. The particular theoretical orientation varies depending on the instructor; often, more than one framework is used. The course assumes basic knowledge of rule-based generative phonology. Prerequisites: LING 450 and LING 451, or equivalents.

LING 504. Syntax II. 3 Credits.
Drawing on one or more theories from the generative tradition, this course explores syntactic forms that are commonly attested in human language. There is emphasis on the role of language universals and linguistic argumentation in arriving at analyses of language phenomena. Prerequisite: LING 452.

LING 505. Typology and Discourse. 3 Credits.
The course covers recent trends relating to language typology and cross-linguistic generalizations, focusing on the domains of morphosyntax, semantics and pragmatics. Prerequisite: LING 452.

LING 506. Field Methods. 3 Credits.
Practical aspects of linguistic field work and analysis, including an intensive practicum with speakers of a non-Western language for the purposes of developing skill in data collection, data management (using some computational tools), and the analysis and description of the phonological, grammatical and lexical structures of human languages. Prerequisites: LING 450 or LING 455 or equivalent and LING 452 or equivalent; recommended prerequisite LING 480. Prerequisite or corequisite: LING 451 or LING 516 or equivalent; LING 506L or equivalent. SS.

LING 506L. Media Technology for Linguistic Research. 1 Credit.
Specialized hardware and software tools for linguistic research on spoken or signed languages (recording, analyzing, and presenting data), with focus on digital images, audio and video, as well as transcription and annotation tools for text analysis. Each student focuses on tools for either signed or spoken languages, with separate sections for each; the class may be retaken for credit if the focus is different. Intended to be taken alongside LING 506 Field Methods, but can also be taken independently, as it is also useful in preparation for several other courses, such as Acoustic Phonetics, Sign Language Phonology, Sign Language Morphosyntax, and for a thesis that involves language data collection or language documentation. Repeatable to a maximum of 2 credits. SS.

LING 507. Special Topics in Linguistics. 1-4 Credits.
Topics of current interest in linguistics. May be repeated if topic is different. Repeatable.

LING 510. Semantics and Pragmatics. 3 Credits.
Various dimensions of meaning on the lexical, propositional, and interpropositional levels. Meaning is studied both as a property of linguistic expressions and as derived from contextual factors. Topics include principles of lexicography, selectional restrictions, operators and their scope, illocutionary force, inference, and relations between form and meaning. Prerequisite: LING 452 or equivalent.

LING 511. Translation of Texts: Theory and Practice. 3 Credits.
This course is an introduction to the theory and practice of text translation, emphasizing the accurate, natural and clear transference of meaning across languages and cultures. Current issues in translation theory will be discussed, especially the approach based on Relevance Theory. Practical aspects of the course will include recognizing common translation problems and solutions, maintaining quality control, the role of computation, program planning aspects of translation projects or activities and teaching others to translate. Prerequisites: LING 452 and two years of foreign language or equivalent proficiency. Prerequisite or corequisite: LING 510. SS, even years.

LING 512. Sociolinguistic Methods in Language Survey. 3 Credits.
This course covers the principles of surveying, quantifying, and interpreting data on language attitudes, identity, bilingualism, intelligibility, vitality, language spread, shift, maintenance and death. Prerequisites or Corequisites: LING 450 and LING 470. SS, odd years.

LING 512L. Sociolinguistic Methods in Language Survey. 1 Credit.
This course is an optional lab to be taken alongside LING 512, enabling potential language surveyors to learn some of the core procedures that are recommended to achieve common survey objectives. Prerequisites or Corequisites: LING 450 and LING 470. SS, odd years.

LING 513. Tone Analysis. 3 Credits.
Analysis of tone systems in the world's spoken languages, covering a comprehensive variety of common tonal phenomena and tone systems. Methodology for analyzing a tonal language, so as to clearly and accurately describe its particular tone system. Implications of tone analysis for orthography development. Prerequisites: LING 450, LING 451 and LING 452. SS.

LING 516. Phonology of Signed Languages. 2-3 Credits.
How the basic phonetic elements in a natural signed language function together in the phonological system of the language. Practice in the application of various theoretical frameworks to problem solving and analysis of specific signed languages, and in applying theoretical concepts of general phonology to signed language research. Prerequisites: Proficiency in a natural signed language equivalent to at least one year of college-level study. Prerequisite or Corequisite: LING 455. SS.

LING 519. Introduction to Literacy Principles. 3 Credits.
Introduction to literacy principles, methods, materials and programs in multilingual societies, especially those involving one or more minority languages. Includes language policy and planning, reading theory, materials design, and literacy program design and implementation, with special emphasis on training and assisting members of the minority language community to establish and maintain ongoing literacy programs. Intended as an introduction to the topic for literacy technicians who will be assisting in literacy programs under the direction of experienced literacy specialists, or for field linguists who are not planning to be literacy specialists. Content is similar to the package of courses 520/521/522, but in less depth; it may be taught with some class sessions in common with the larger package. Corequisites: LING 530 is recommended. Prerequisite or Corequisite: LING 470. SS.

LING 520. Foundational Issues of Community-based Literacy in Multilingual Societies. 3 Credits.
Upon completion of this course, students will be able to: (a) explain in detail the inter-relationship between illiteracy, poverty, politics and environment; (b) identify and describe the major movements and trends in literacy; (c) explain and teach the principles of adult education; (d) identify the major “players” in the field of adult literacy; (e) explain the major issues involved in developing a multilingual education program for school children. Corequisites: LING 521 and LING 522. SS, odd years.
LING 521. Literacy Program Planning and Management. 3 Credits.
Upon completion of this course, students will be able to: (a) explain, with examples, change processes in traditional communities; (b) design a complete literacy program; (c) explain alternative strategies for designing and managing a literacy program; (d) evaluate the need for external funding in a literacy program; (e) do detailed costing for a literacy program; (f) write a funding proposal for a literacy program; and (g) use the LinguaLinks Electronic Performance Support System and access relevant internet resources.
Corequisites: LING 520 and LING 522. SS, odd years.

LING 522. Materials and Methods in Adult Literacy. 3 Credits.
Upon completion of this course, students will be able to: (a) explain some of the major theories of reading and the history of their evolution; (b) explain, describe, and critique various instructional strategies for teaching reading; (c) design instructional materials from any one of five different strategies for teaching reading; (d) design teacher training protocols for literacy programs; (e) design testing protocols for reading materials; (f) develop instructional materials for transitional literacy programs; (g) organize and direct a writers' workshop; and (h) explain the need for postliteracy materials and how to develop these.
Corequisites: LING 520 and LING 521. SS, odd years.

LING 526. Morphosyntax of Signed Languages. 2-3 Credits.
Reasons for considering signed languages as natural languages. Morphological and syntactic properties that are characteristic of signed languages and which distinguish them from spoken languages, with brief mention of semantics and discourse. Specific issues important to the analysis of signed languages, including: glossing conventions, grammaticalization of space, deixis and agreement, lexical structure, lexicalized borrowing, verb classes, aspect, classifiers, iconicity and metaphor, nonmanuals, and information structure. Prerequisite: LING 452 and proficiency in a natural signed language equivalent to at least one year of college-level study. SS.

LING 530. Introduction to Writing Systems. 1 Credit.
Introduction to the principles of designing and testing a writing system for a spoken or signed language. Attention is given to linguistic, sociolinguistic, educational, psycholinguistic, political/ideological, production and implementation issues in orthographic development. Prerequisite or corequisite: Either a) prerequisite LING 470 and corequisite LING 451; b) prerequisite LING 470 and corequisite LING 516; or c) corequisites LING 520, LING 521 and LING 522. SS.

LING 534. Historical Linguistics. 3 Credits.
Discovery of historical relationships between languages with primary focus on the comparative method for identifying regular sound changes and reconstructing parent languages, as well as identifying contact-induced changes such as areal diffusion and borrowing. Some coverage of internal reconstruction and historical morphology/syntax. Historical linguistics has applications for language survey, language planning and development and adaptation of translated materials between related languages. Prerequisites: LING 451 and LING 470 or equivalents. SS.

LING 535. Ethnographic Methods in Field Linguistics. 3 Credits.
Major areas within cultural anthropology (social, political, economic, religious, etc.) particularly with respect to issues that affect how one conducts field linguistic research and language development projects in a cross-cultural context, and which emphasize the interrelatedness of language and culture. Methods of ethnographic field methods for collecting cultural data, including practical experience in applying those methods in a research project. Recommended to be taken at the same time as LING 506, Field Methods, because of the possibilities for integrated assignments between the two courses. Prerequisite: 6 credits in linguistics or consent of instructor.

LING 536. Language Documentation. 3 Credits.
Language documentation goes beyond collection of language data, analysis of that data, and language description based on that data. Successful language documentation results in a body of recordings and transcriptions that can be used by later researchers and community members interested in studying aspects of the language and culture that the original researcher had not even thought about. In a number of cases, it has provided the basis for revitalization of languages that were highly endangered or even dead. In this course you will learn the relationship between language documentation and language description. You will learn to perform the basic tasks of language and culture documentation, including planning, archiving, and managing the metadata associated with the corpus. The grade for the course will be based on projects that you design either individually or in groups. Prerequisite: An introductory course in linguistics. Prerequisite or Corequisite: LING 506L.

LING 580. Academic Writing in Linguistics. 1 Credit.
Instruction and practice in academic writing within the field of linguistics. All students will be required to submit a sample of their writing for peer review, and review fellow students' writing. Prerequisite: Acceptance to the MA program in Linguistics or permission of the instructor. SS.

LING 590. Directed Studies in Linguistics. 1-4 Credits.
Supervised individual study. May be repeated if the topic is different. A maximum of 4 credits in LING 590 and 594 may be applied to the M.A. in linguistics. Repeatable to 4 credits.

LING 594. Research in Linguistics. 1-4 Credits.
Supervised individual research. May be repeated if topic is different. A maximum of 4 credits in LING 590 and 594 may be applied to the M.A. in linguistics. Repeatable to 4 credits.

LING 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

LING 998. Thesis. 1-9 Credits.
Repeatable to 9 credits.

Undergraduate Courses for Graduate Credit

LING 450. Articulatory Phonetics. 2 Credits.
Introduction to the theory and practice of articulatory phonetics. SS.

LING 451. Phonology I. 3 Credits.
Introduction to phonological analysis; intensive practice in applying theoretical principles to problem solving and to field techniques. Prerequisite: LING 450 or with permission of the instructor ENGL 209 as a prerequisite and LING 450 as a corequisite. SS.

LING 470. Introduction to Sociolinguistics and Language Development. 2 Credits.
Introduction to language variation as influenced by social interaction, with special attention to participatory language development in multilingual societies. SS.

Graduate Certificate in Community-Based Literacy as Applied Linguistics

The Graduate Certificate in Community-Based Literacy as Applied Linguistics, which is offered as part of UND’s Linguistics program, is intended to prepare students to promote literacy in other countries, particularly in multilingual societies and through non-traditional programs that are outside the formal educational system. Examples of such programs include those that address adult functional literacy (in health, agriculture, etc.), rights-based literacy, literacy in the local language first with transition to biliteracy in a national language or other language of wider communication, and transfer of literacy skills from a language of wider communication to literacy in the local language.

Mission Statement
To prepare students to organize, teach, manage and promote non-formal literacy programs in multilingual societies, particularly in developing countries, and to provide a graduate-level credential to people working in literacy in other countries where such a credential is often expected by governments and NGOs and can be very helpful for career advancement.

Admission Requirements
1. A four-year bachelor's degree from a recognized college or university.
2. Either:
   a. one year of experience living and working in another country and culture; or
   b. a course in cultural anthropology or sociolinguistics at the 300-level or higher.
3. A GPA for all previous college-level work of 2.8 or better.

In addition, it is recommended that students have either a background in education or in linguistics (such as one summer at UND taking courses from SIL).
Certificate Requirements

1. The following courses:
   - LING 520  Foundation of Issues in Community-based Literacy in Multilingual Societies 3
   - LING 521  Literacy Program Planning and Management 3
   - LING 522  Materials and Methods in Adult Literacy 3
   - LING 530  Introduction to Writing Systems 1
   Total Credits 10

A maximum of nine credits from this graduate certificate may be used toward the M.A. in linguistics, if the student enrolls in the M.A. program after completing the certificate. No professional accreditation is associated with the certificate.

See more detailed information at: http://arts-sciences.und.edu/summer-institute-of-linguistics.

Master of Arts in Linguistics

Admission Requirements

The applicant must meet the School of Graduate Studies' current minimum general admission requirements as published in the graduate catalog.

1. A four-year bachelor’s degree from a recognized college or university.
2. A minimum of 20 semester credits in linguistics or related fields, e.g., foreign language, of which at least 10 credits must be in linguistics, and which must include the equivalent of LING 452 Syntax and Morphology I.
3. A cumulative Grade Point Average (GPA) of at least 2.8 for all undergraduate work or a GPA of at least 3.0 for the junior and senior years of undergraduate work (based on A= 4.00).
4. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.
5. Students deficient in prerequisite credits (see #2 above) should generally plan to take their first summer as non-degree graduate students. Up to nine credits taken as a non-degree graduate student can be applied to the M.A. Therefore, students who meet some, but not all, of the prerequisites can use some of the credits gained as non-degree graduate students to meet the prerequisites, and apply some to the M.A. Foreign language proficiency may be demonstrated by passing an examination in the language in lieu of formal credits.

Degree Requirements

Students seeking the Master of Arts degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Linguistics Program.

1. A minimum of 32 credits including:
   a. 3 credits listed in the Linguistics section of the graduate catalog in the area of phonetics/phonology
   b. 3 credits in Linguistics in syntax/semantics
   c. 3 credits in Linguistics in applied linguistics
   d. LING 580 Academic Writing in Linguistics
   e. 4 credits for a thesis
   f. At least 5 other credits in Linguistics
2. Of the remaining 13 credits, courses with linguistics content offered by other departments, such as English, may be counted as linguistics credits for the major.
3. Up to 4 credits of Directed Study and Research courses, e.g. LING 599 Directed Studies in Linguistics and LING 594 Research in Linguistics, may be used to supplement the standard graduate course offerings.
4. Nine credits may be in a minor or in cognate courses (see the Degree Requirements (http://und-public.courseleaf.com/graduateacademicinformation/degreerequirements) section of the graduate catalog.)
5. At least one-half of the credits must be at or above the 500-level.
6. Students normally satisfy the residency requirements by spending at least two summers enrolled in the program.
7. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.
8. The thesis will be based on the analysis of language data collected by the student or on theoretical or applied applications of data arising from language research.

See more detailed information at: http://arts-sciences.und.edu/summer-institute-of-linguistics.

Mathematics

M.S. with Major in Mathematics (p. 473)
M.Ed. with Major in Mathematics (p. 473)
Minor in Statistics (p. 473)

Courses

MATH 505. Seminar in Mathematics. 1-3 Credits. Repeatable.
MATH 512. Modern Analysis I. 3 Credits. Prerequisite: MATH 432.
MATH 513. Modern Analysis II. 3 Credits. Prerequisite: MATH 432.
MATH 515. Applied Mathematics. 3 Credits. Prerequisite: MATH 432.
MATH 518. Algebra I. 3 Credits. Prerequisite: MATH 441 and MATH 442.
MATH 519. Algebra II. 3 Credits. Prerequisite: MATH 441 and MATH 442.
MATH 520. Topology I. 3 Credits. Prerequisite: MATH 431.
MATH 521. Topology II. 3 Credits. Prerequisite: MATH 431.
MATH 541. Linear Statistical Models. 3 Credits. Prerequisite: MATH 422 or consent of instructor.
MATH 542. Advanced Topics in Statistics and Probability. 3 Credits.
The content of the course varies but may include (but is not restricted to) current topics in statistics and probability such as (1) time series, (2) sampling, (3) nonparametric statistics, (4) experimental design, (5) probability theory, (6) statistical theory, (7) multivariate statistical analysis. Prerequisite: MATH 541 or consent of instructor.

MATH 576. Algebra and Geometry for Middle School Teachers. 3 Credits.
Algebra and Geometry course intended for middle school teachers: a) planning to qualify to teach middle school mathematics; or b) teachers looking to enrich their content knowledge in mathematics. Topics may include: rational number system, introduction to number theory, algebraic thinking, spatial reasoning and representation, introduction to Euclidean and non-Euclidean geometry, problem solving and pedagogical issues. May not be used in Ph.D. or Master's programs. Prerequisites: Licensed K-12 teacher, College Algebra, and instructor consent.

MATH 577. Calculus Concepts for Middle School Teachers. 3 Credits.
Calculus course intended for middle school teachers: a) planning to qualify to teach middle school mathematics; or b) teachers looking to enrich their content knowledge in mathematics. Topics may include: analysis of functions, mathematical modeling, limits, continuity, differentiation, integration, and pedagogical issues. May not be used in Ph.D. or Master's programs. Prerequisites: Licensed K-12 teacher, College Algebra, and instructor consent.

MATH 578. Probability and Statistics for Middle School Teachers. 3 Credits.
Probability and statistics course intended for middle school teachers: a) planning to qualify to teach middle school mathematics; or b) teachers looking to enrich their content knowledge in mathematics. Topics may include: counting, empirical and theoretical probabilities, simulation of probabilistic events, conditional probability, expected value, data and variables, random sampling, measures of central tendency and spread, least squares regression, and pedagogical issues. May not be used in Ph.D. or Master's programs. Prerequisites: Licensed K-12 teacher, College Algebra, and instructor consent.

MATH 579A. Practicum in Middle School Mathematics. 2 Credits.
Teachers will use their content and pedagogical knowledge to plan lesson(s) and develop and implement an action research project in their school. May be repeated for up to 6 credits. May not be used in Ph.D. or Master's programs. Prerequisites: Licensed K-12 teacher, Math 276, 577 or 578 and instructor consent. Repeatable to 6 credits.

MATH 579B. Practicum in Middle School Mathematics. 2 Credits.
Teachers will use their content and pedagogical knowledge to plan lesson(s) and develop and implement an action research project in their school. May be repeated for up to 6 credits. May not be used in Ph.D. or Master's programs. Prerequisites: Licensed K-12 teacher, Math 276, 577 or 578 and instructor consent.

MATH 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

MATH 997. Independent Study. 2 Credits.

MATH 998. Thesis. 1-9 Credits.
Repeatable to 9 credits.

Undergraduate Courses for Graduate Credit

MATH 405. Selected Topics in Mathematics. 1-3 Credits.
May be repeated to maximum of six credits. Prerequisite: Permission of the Mathematics Department. Repeatable to 6 credits. On demand.

MATH 408. Combinatorics. 3 Credits.
Introduction to the techniques and reasoning needed in combinatorial problem-solving. The course may include topics related to combinatorics, such as graph theory. Prerequisites: MATH 166 and MATH 208. S, odd years.

MATH 409. Geometry. 3 Credits.
Metric and synthetic approach to Euclidean geometry. The usual topics in elementary geometry treated in a mathematically logical way. Topics include congruence, inequalities, parallelism, similarity, area, solid geometry and the circle. Prerequisite: MATH 208 or MATH 330. F.

MATH 412. Differential Equations. 3 Credits.
Basic types of ordinary differential equations. Existence and uniqueness of solutions. Prerequisite: MATH 266. S, even years.

MATH 415. Topics in Applied Mathematics. 1-3 Credits.
An introduction to selected areas in applied mathematics chosen from a variety of topics including: Applied algebra, difference equations, linear programming, modeling and simulation, operations research, optimization, partial differential equations and computers in mathematics. Topics to be considered will be illustrated with examples and practical applications. May be repeated for credit with consent of instructor up to a maximum of six credits. Prerequisites: MATH 265 and consent of instructor. Repeatable to 6 credits. On demand.

MATH 416. Topics in Statistics. 1-3 Credits.
An introduction to a variety of topics in statistics including: Linear models in categorical analysis, Bayesian methods, decision theory, ridge regression, Non parametric techniques, stochastic games and models. The number of topics to be considered during a semester will be limited to permit greater depth of coverage and sufficient practical illustrations. May be repeated for credit with consent of instructor up to six credits. Prerequisites: MATH 265 and MATH 321 or consent of instructor. Repeatable to 6 credits. On demand.

MATH 421. Statistical Theory I. 3 Credits.
Discrete and continuous random variables, expectation, moments, moment generating functions, properties of special distributions, introduction to hypothesis testing, sampling distributions, Central Limit Theorem, curve of regression, correlation, empirical regression by least squares, maximum likelihood estimation, Neyman-Pearson lemma, likelihood ratio test, power function, chi-square tests, change of variable, "t" and "F" tests, one and two-way ANOVA, nonparametric methods. Prerequisite: MATH 265. F.

MATH 422. Statistical Theory II. 3 Credits.
Discrete and continuous random variables, expectation, moments, moment generating functions, properties of special distributions, introduction to hypothesis testing, sampling distributions, Central Limit Theorem, curve of regression, correlation, empirical regression by least squares, maximum likelihood estimation, Neyman-Pearson lemma, likelihood ratio test, power function, chi-square tests, change of variable, "t" and "F" tests, one and two-way ANOVA, nonparametric methods. Prerequisite: MATH 421. S.

MATH 431. Introduction to Analysis I. 3 Credits.
Development of the real number system, functions, sequences, limits, continuity, and differentiation. Prerequisite: MATH 330 or consent of instructor. F.

MATH 432. Introduction to Analysis II. 3 Credits.
A continuation of MATH 431. Topics in the second semester include integration, partial differentiation, infinite series, power series and vector analysis. Prerequisite: MATH 431. S.

MATH 435. Theory of Numbers. 3 Credits.
Basic properties of numbers, including divisibility, primes, congruences, Diophantine equations and residue theory. Prerequisite: MATH 208 or 330. S.

MATH 441. Abstract Algebra. 3 Credits.
Rings, integral domains, fields, elements of group theory. Prerequisite: MATH 330 or consent of instructor. F.

MATH 442. Linear Algebra. 3 Credits.
A theoretical treatment of systems of linear equations, matrices, vector spaces, linear transformations and elementary canonical forms. Prerequisites: MATH 207 and MATH 330 or consent of instructor. S.

MATH 460. Mathematical Modeling. 3 Credits.
The primary goal of the course is to present the mathematical analysis provided in scientific modeling. Topics may include population modeling, mechanical vibrations, traffic flow, epidemic modeling, queues and decay processes. Prerequisites: MATH 266 and MATH 207 or consent of instructor. On demand.

MATH 461. Numerical Analysis. 3 Credits.
Numerical techniques for: the solution of equations in one or several unknowns, approximate integration, differential equations, approximation theory, optimization theory and matrix analysis. Corresponding error analysis will be investigated. Prerequisites: MATH 266 and a scientific programming language. On demand.

MATH 471. Introduction to Complex Variables. 3 Credits.
The complex plane, analytic functions, complex integration, power series, the theory of residues and contour integration, conformal mapping, Fourier and Laplace transformations, and applications. Prerequisite: MATH 265. F, even years.

MATH 494. Reading Course in Mathematics. 1-3 Credits.
Directed individual reading on selected topics not developed in other courses. Repeatable to six credits. Prerequisites: Consent of instructor. Repeatable to 6 credits. F,S,SS.
MATH 405. Readings in Mathematics. 1-3 Credits.
Directed individual reading on selected topics not developed in other courses. Repeatable to six credits. Prerequisite: Consent of instructor. Repeatable to 6 credits. F.S.S.

Graduate Minor in Statistics

The requirements consist of 9 hours of which MATH 421 Statistical Theory I and MATH 422 Statistical Theory II are required if they were not taken as an undergraduate. The remaining credits may be selected from various probability and statistics-oriented courses in mathematics and other disciplines. For further information about this option, contact the chair of the Mathematics Department.

Master of Education in Mathematics

Admission Requirements

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. Satisfy the undergraduate requirements in Education, i.e., 18 credit hours in Education including student teaching.
2. The equivalent of a bachelor’s degree with a major in mathematics.
3. A cumulative grade point average (GPA) of at least 2.75 for all undergraduate work or a GPA of at least 3.0 for the junior and senior years of undergraduate work (based on A=4.0).
4. Students who have not completed the equivalent of the following courses will be required to do so as part of their graduate program.

5. MATH 409 Geometry 3
   MATH 421 Statistical Theory I 3
   MATH 431 Introduction to Analysis I 3
   MATH 441 Abstract Algebra 3
   MATH 442 Linear Algebra 3

5. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

Degree Requirements

1. A minimum of 32 semester credits is required for the M.Ed. degree, including two credits for the independent study.
2. At least one-half of the credits must be at or above the 500-level.
3. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.
4. Preparation of a written independent study approved by the faculty advisor.
5. Comprehensive final examination.
6. Required Courses:

   Select two of the following sequences:
   MATH 512 and MATH 513 Modern Analysis I and II
   MATH 515 and MATH 516 Applied Mathematics
   MATH 518 and MATH 519 Algebra I and II
   MATH 520 and MATH 521 Topology I and II
   MATH 541 and MATH 542 Linear Statistical Models and Advanced Topics in Statistics and Probability

   At least one additional graduate level mathematics course 3
   MATH 998 Thesis 4
   Electives/Cognates 11
   Total Credits 30

Non-Thesis Option

1. Thirty-two (32) credits including a minimum of two credits of MATH 997 Independent Study.
2. At least one-half of the credits must be at or above the 500-level.
3. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.
4. The program may include just the major, the major and a minor, or the major and a cognate area. The major must include 20 credits from the major department, and a minor or cognate area must include at least nine credits.
5. Preparation of a written independent study approved by the faculty advisor.
6. Comprehensive final examination.
7. Required Courses:

   Select two of the following sequences:
   MATH 512 and MATH 513 Modern Analysis I and II
   MATH 515 and MATH 516 Applied Mathematics
   MATH 518 and MATH 519 Algebra I and II
   MATH 520 and MATH 521 Topology I and II
   MATH 541 and MATH 542 Linear Statistical Models and Advanced Topics in Statistics and Probability

   At least one additional graduate level mathematics course 3
   MATH 998 Thesis 4
   Electives/Cognates 11
   Total Credits 30

Master of Science with Major in Mathematics

Admission Requirements

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. The equivalent of a bachelor’s degree with a major in mathematics.
2. A cumulative grade point average (GPA) of at least 2.75 for all undergraduate work or a GPA of at least 3.0 for the junior and senior years of undergraduate work (based on A=4.0).
3. Students who have not completed the equivalent of MATH 431 Introduction to Real Analysis will be required to do so as part of their graduate program.
4. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog. Students without the required degree, or equivalent, may be admitted but will be required to satisfactorily complete undergraduate courses to make up their deficiency before advancement to Approved status.

Degree Requirements

Students seeking the Master of Science degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Mathematics Department.

Thesis Option

1. A minimum of 30 semester credits in a major field, including the credits granted for the thesis and the research leading to the thesis.
2. The program may include just the major, the major and a minor, or the major and a cognate area. The major must include 20 credits from the major department, and a minor or cognate area must include at least nine credits.
3. At least one-half of the credits must be at or above the 500-level.
4. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.
5. Comprehensive final examination.
6. Required Courses:

   Select two of the following sequences:
   MATH 512 Modern Analysis I
   & MATH 513 Modern Analysis II
   MATH 515 Applied Mathematics
   & MATH 516 Applied Mathematics
   MATH 518 Algebra I
   & MATH 519 Algebra II
   MATH 520 Topology I
   & MATH 521 Topology II
   MATH 541 Linear Statistical Models
   & MATH 542 Advanced Topics in Statistics and Probability

   At least one additional graduate level mathematics course 3
   MATH 998 Thesis 4
   Electives/Cognates 11
   Total Credits 30

Non-Thesis Option

1. Thirty-two (32) credits including a minimum of two credits of MATH 997 Independent Study.
2. At least one-half of the credits must be at or above the 500-level.
3. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.
4. The program may include just the major, the major and a minor, or the major and a cognate area. The major must include 20 credits from the major department, and a minor or cognate area must include at least nine credits.
5. Preparation of a written independent study approved by the faculty advisor.
6. Comprehensive final examination.
7. Required Courses:

   Select two of the following sequences:
   MATH 512 Modern Analysis I
   & MATH 513 Modern Analysis II
   MATH 515 Applied Mathematics
   & MATH 516 Applied Mathematics
   MATH 518 Algebra I
   & MATH 519 Algebra II
   MATH 520 Topology I
   & MATH 521 Topology II
   MATH 541 Linear Statistical Models
   & MATH 542 Advanced Topics in Statistics and Probability

   At least one additional graduate level mathematics course 3
   MATH 998 Thesis 4
   Electives/Cognates 11
   Total Credits 30
Medical Laboratory Science

M.S. in Medical Laboratory Science (p. 475)

Courses

MLS 501. Advanced Laboratory Practice: Technical Concepts. 3 Credits.
An examination of technical concepts and skills utilized to ensure quality in the medical laboratory. The course will focus on enhancing quality control analysis and method validation skills, and utilizing statistical tools to monitor and improve quality testing processes in the medical laboratory. Offered once per 3-year cycle (fall or spring semester). See program website for current course rotation. Prerequisite: MLS program students only.

MLS 502. Advanced Clinical Hematology: Erythrocytes. 3 Credits.
A comprehensive study of human erythrocytes. Included are discussions of normal erythrocyte structure, function, production, regulation, and the pathophysiology of related disorders. The role of current laboratory testing in the diagnosis of erythrocyte disorders will be emphasized. Offered once per 3-year cycle (fall or spring semester). See program website for current course rotation. Prerequisite: MLS program students only. F.S.

MLS 503. Advanced Clinical Hematology: Leukocytes. 3 Credits.
A comprehensive study of human leukocytes. Included are discussions of normal leukocyte structure, function, production, regulation, and the pathophysiology of related disorders. The role of current laboratory testing in the diagnosis of leukocyte disorders will be emphasized. Offered once per 3-year cycle (fall or spring semester). See program website for current course rotation. Prerequisite: MLS program students only. F.S.

MLS 505. Advanced Laboratory Practice: Financial Management. 3 Credits.
This course presents an overview of financial management for medical laboratories. Students examine several basic financial operation concepts, including how to evaluate productivity, manage salaries, and manage supply inventories for maximum cost containment. Students learn how to plan for capital expenditures, set laboratory fee rates, and create, implement, and evaluate a budget. Offered once per 3-year cycle (fall or spring semester). See program website for current course rotation. Prerequisite: MLS program students only. F.S.

MLS 506. Advanced Clinical Chemistry. 3 Credits.
An advanced study of the theories and principles of clinical chemistry. Correlation of laboratory results with associated disease pathophysiology will be emphasized. Offered once per 3-year cycle (fall or spring semester). See program website for current course rotation. Prerequisite: MLS program students only. F.S.

MLS 507. Advanced Clinical Immunohematology. 3 Credits.
A detailed study of human blood groups including laboratory aspects of blood banking with special reference to theoretical and clinical applications. Emphasis will be placed on antibody identification and advanced problem solving techniques. Offered once per 3-year cycle (fall or spring semester). See program website for current course rotation. Prerequisite: MLS program students only. F.S.

MLS 508. Leadership for the Laboratory Professional. 3 Credits.
This course will focus on developing leadership skills applicable to the medical laboratory profession. Offered once per 3-year cycle (fall or spring semester). See program website for current course rotation. Prerequisite: MLS program students only. F.S.

MLS 509. Medical Laboratory Education: Teaching Principles. 3 Credits.
Approaches to teaching in Medical Laboratory Science will be examined, with an emphasis on development of instructional and evaluative materials. Additional topics discussed will include learner diversity, classroom management techniques, and course assessment. Offered once per 3-year cycle (fall or spring semester). See program website for current course rotation. Prerequisite: MLS program students only. F.S.

MLS 513. Advanced Clinical Immunology. 3 Credits.
An in-depth investigation of immune system functions. Correlation of laboratory results with normal and disease states will be emphasized. Offered once per 3-year cycle (fall or spring semester). See program website for current course rotation. Prerequisites: Restricted to MS in MLS program students only. F.S.

MLS 515. Capstone in Medical Laboratory Science. 2 Credits.
This course is a summative experience that occurs at the end of the degree process. Graduate-level Medical Laboratory Science students reflect upon and consider applications of degree coursework. Additionally, the future of the medical laboratory science profession will be discussed and career opportunities will be explored. Prerequisites: Completion of at least 20 credits in the MLS Master of Science Program; MLS program students only. S.

MLS 516. Special Topics in Medical Laboratory Science. 1-4 Credits.
Topical courses in laboratory medicine organized on a semester by semester basis. Prerequisite: MLS program students only. Repeatable to 12 credits. F.S.

MLS 517. Advanced Laboratory Practice: Administrative Concepts. 3 Credits.
An examination of administrative concepts and skills utilized to ensure quality in the medical laboratory. The course will focus on advanced concepts related to medical laboratory accreditation, inspection, and federal regulations. An emphasis will be placed on the utilization of best practices to monitor and improve laboratory diagnostics. Offered once per 3-year cycle (fall or spring semester). See program website for current course rotation. F.S.

MLS 518. Advanced Molecular Diagnostics. 3 Credits.
An analysis of specific molecular biology application in the medical laboratory including correlation of cell biology, DNA chemistry, genetics, and laboratory techniques in relation to diagnostic investigations. Course offered in Fall or Spring Semester on a 3-year cycle. F.S.

MLS 522. Advanced Clinical Bacteriology. 3 Credits.
An advanced study of the laboratory diagnosis of bacterial diseases and an in depth exploration of antibacterial agents. Offered once per 3-year cycle (fall or spring semester). See program website for current course rotation. F.S.

MLS 523. Advanced Non-Bacterial Microbiology. 3 Credits.
An advanced study of the laboratory diagnosis of viral, fungal, and parasitic diseases and associated antimicrobial agents. F.S.

MLS 524. Current Trends and Issues in Medical Laboratory Science. 2 Credits.
This course is an introductory experience that occurs at the beginning of the degree process. Through group discussion and presentations, Medical Laboratory Science graduate students will explore current trends and issues related to all aspects of the profession. F.

MLS 525. Professional Communication in the Medical Laboratory. 3 Credits.
This course will focus on developing written and oral communication skills as a foundation for application within the medical laboratory profession. Students will learn how to identify, assess, and incorporate appropriate reference materials to prepare professional, scholarly papers and presentations. Prerequisite: Must be satisfactorily completed in the first or second semester of degree coursework. F.S.

MLS 526. Advanced Clinical Hemostasis. 3 Credits.
A comprehensive study of the human hemostatic system. Normal function, disease pathophysiology, and the evolution of hemostasis in healthcare will be discussed. The laboratory's role in the diagnosis and/or monitoring of bleeding and clotting disorders will be emphasized. Offered once per 3-year cycle (fall or spring semester). See program website for current course rotation. F.S.

MLS 527. Medical Laboratory Education: Assessment and Accreditation. 3 Credits.
This course will focus on assessment and accreditation specific to medical laboratory education programs. Topics will include examination of assessment at the classroom, program, and institutional levels, including how to create and implement an assessment plan. Medical laboratory education accreditation processes will also be examined, with an emphasis on the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS) standards. Offered once per 3-year cycle (fall or spring semester). See program website for current course rotation. F.S.

MLS 530. Medical Laboratory Leadership: Principles & Practice. 1 Credit.
This course will provide an overview of leadership principles and their relation to the medical laboratory profession. On demand.
MLS 531. Medical Laboratory Leadership: Practical Applications. 1 Credit.
This course will focus on application of leadership strategies within the medical laboratory profession. On demand.

MLS 532. Medical Laboratory Leadership: Conflict Resolution. 1 Credit.
This course will focus on developing strategies and skills for conflict resolution within the medical laboratory profession. On demand.

MLS 589. Readings in Medical Laboratory Science. 1 Credit.
Examination of applicable literature related to Medical Laboratory Science as part of an area of specialization or interest. Prerequisite or Corequisite: MLS 525. Repeatable to 3 credits. F.S.

MLS 590. Project Development. 1 Credit.
With faculty/advisor consult, the student will identify a topic and develop a proposal for the Independent Study completed in MLS 997. Initial scholarly investigation of the selected topic will occur, and general guidelines for project format and content will be discussed. Prerequisite: MLS 525. F.S.

MLS 591. Directed Study in Laboratory Medicine. 1-6 Credits.
Designed to meet the needs of individual student-focused studies in laboratory medicine. Prerequisite: Restricted to Master of Medical Lab Science students. Repeatable to 6 credits. On demand.

MLS 996. Continuing Enrollment. 1-12 Credits.
Prerequisite: MLS program students only. Repeatable. S/U grading.

MLS 997. Independent Study. 2 Credits.
The independent study is a culminating experience for Medical Laboratory Science graduate students. Utilizing skills and information acquired throughout the degree process, students will select, investigate, and present findings of a topic with significance to the major field of study. Prerequisite: MLS program students only. F.S.

Master of Science in Medical Laboratory Science

Admission Requirements
Applicants who are seeking admission to School of Graduate Studies must meet all of the minimum general School of Graduate Studies admission requirements identified in the graduate catalog. In addition, prospective students must fulfill the following requirements for admission to the graduate program in Medical Laboratory Science. Application deadlines can be found on the MLS or UND School of Graduate Studies websites.

1. B.A. or B.S. degree and successful completion of the MLS (NCA), MT (ASCP) certification examinations (include proof of certification with School of Graduate Studies application).
2. Cumulative Grade Point Average (GPA) of at least 3.0 (on a 4.0 scale) for the junior and senior years of undergraduate work.
3. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.
4. At least two years of prior work experience in a medical laboratory is preferred (include a resume of applicable work experience with School of Graduate Studies application).

Degree Requirements
Students seeking the Master of Science degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Medical Laboratory Science Program.

1. A minimum of 33 semester credits as follows (see 'Curriculum' for course lists):
   - Foundation Courses = 12 Credits
   - Core Courses = 12 Credits
   - Elective Courses = 9 Credits
2. A cognate area of study or minor (minimum of 9 credits) is optional.
3. Successful completion of comprehensive examinations that takes place at the end of the student’s program of study.

Curriculum

FOUNDATION COURSES
All Foundation Courses are required for degree completion. Each course is offered at least annually. MLS 524 must be completed during the first or second fall semester of coursework. MLS 515 must be completed during the spring semester closest to degree completion. MLS 525 must be completed in the first semester of coursework.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MLS 501</td>
<td>Advanced Laboratory Practice: Technical Concepts</td>
<td>3</td>
</tr>
<tr>
<td>MLS 515</td>
<td>Capstone in Medical Laboratory Science</td>
<td>2</td>
</tr>
<tr>
<td>MLS 524</td>
<td>Current Trends and Issues in Medical Laboratory Science</td>
<td>2</td>
</tr>
<tr>
<td>MLS 997</td>
<td>Independent Study</td>
<td>2</td>
</tr>
<tr>
<td>MLS 525</td>
<td>Professional Communication in the Medical Laboratory</td>
<td>3</td>
</tr>
</tbody>
</table>

CORE COURSES
At least 12 credits of Core Courses (from a minimum of 4 separate courses) of the listed Core Courses are required for degree completion. Core Course credits beyond 12 can be counted as Elective credits. Core Courses are offered on a 3-year cycle.

<table>
<thead>
<tr>
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</tr>
<tr>
<td>MLS 503</td>
<td>Advanced Clinical Hematology: Leukocytes</td>
<td>3</td>
</tr>
<tr>
<td>MLS 506</td>
<td>Advanced Clinical Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>MLS 507</td>
<td>Advanced Clinical Immunohematology</td>
<td>3</td>
</tr>
<tr>
<td>MLS 513</td>
<td>Advanced Clinical Immunology</td>
<td>3</td>
</tr>
<tr>
<td>MLS 518</td>
<td>Advanced Molecular Diagnostics</td>
<td>3</td>
</tr>
<tr>
<td>MLS 522</td>
<td>Advanced Clinical Bacteriology</td>
<td>3</td>
</tr>
</tbody>
</table>

* Only one of these courses can be counted as a Core Course (if both are taken, the second would be counted as an Elective)

ELECTIVE COURSES
At least 9 credits (from a minimum of 3 separate courses) of Elective courses are required for degree completion. Note that any Core Course taken beyond the required 12 credits can also be counted as an Elective course. Elective courses are offered on a 3-year cycle, with the exception of MLS 516, MLS 589, MLS 590, and MLS 591 which are offered more frequently.

<table>
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<td>Medical Laboratory Education: Teaching Principles</td>
<td>3</td>
</tr>
<tr>
<td>MLS 516</td>
<td>Special Topics in Medical Laboratory Science</td>
<td>1-4</td>
</tr>
<tr>
<td>MLS 517</td>
<td>Advanced Laboratory Practice: Administrative Concepts</td>
<td>3</td>
</tr>
<tr>
<td>MLS 523</td>
<td>Advanced Non-Bacterial Microbiology</td>
<td>3</td>
</tr>
<tr>
<td>MLS 526</td>
<td>Advanced Clinical Hemostasis</td>
<td>3</td>
</tr>
<tr>
<td>MLS 527</td>
<td>Medical Laboratory Education: Assessment and Accreditation</td>
<td>3</td>
</tr>
<tr>
<td>MLS 530</td>
<td>Medical Laboratory Leadership: Principles &amp; Practice</td>
<td>1</td>
</tr>
<tr>
<td>MLS 531</td>
<td>Medical Laboratory Leadership: Practical Applications</td>
<td>1</td>
</tr>
<tr>
<td>MLS 532</td>
<td>Medical Laboratory Leadership: Conflict Resolution</td>
<td>1</td>
</tr>
<tr>
<td>MLS 589</td>
<td>Readings in Medical Laboratory Science</td>
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</tr>
<tr>
<td>MLS 590</td>
<td>Project Development</td>
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<tr>
<td>MLS 591</td>
<td>Directed Study in Laboratory Medicine</td>
<td>1-6</td>
</tr>
</tbody>
</table>

Music

Master of Music (p. 478)
Ph.D. in Music Education (p. 477)

Courses
MUCS 500. Introduction to Graduate Study in Music. 3 Credits.
A course covering bibliography, methodology and scholarly discourse in the principal areas of research in music. F.
MUSC 501. Graduate Music Theory Review. 1-3 Credits.
The course is intended for students seeking internships in the field of music. The study of formal systems in music through selected musical works. Prerequisites: MUSC 501 or passing grade on placement examination. S, even years.

MUSC 502. Perspectives in Music Theory. 3 Credits.
The study of formal systems in music through selected musical works. Prerequisites: MUSC 501 or passing grade on placement examination. S, even years.

MUSC 503. Psychological Foundations of Music Learning. 3 Credits.
An in-depth study of the psychological processes of music learning. S, odd years.

MUSC 504. Seminar in Music. 1-4 Credits.
Seminars concerning various topics of interest to the faculty and students.

MUSC 505. Graduate Music History Review. 3 Credits.
An accelerated comprehensive review of western music history designed to prepare students for other graduate-level music courses, emphasizing group learning through individual preparation. Credit does not count toward fulfillment of 32-hour minimum. Music graduate degree requirements. May be waived by examination.

MUSC 506. Advanced Composition. 1-4 Credits.
The composition and performance of original works in selected instrumental and vocal media. May be repeated without limitation. Repeatable.

MUSC 507. Foundations of Music Education. 3 Credits.
A comprehensive investigation of the historical, philosophical, and aesthetic foundations of music including current trends in music education. S, odd years.

MUSC 508. Perspectives of Music History. 3 Credits.
A course on various topics on the history and literature of music and related musicological fields. This course may require preparation and delivery of a substantial research paper on an appropriate topic. Repeatable when topics vary. Prerequisites: MUSC 500 and MUSC 505, or passing grade on placement examination, or instructor's permission. Repeatable to 15 credits. S.

MUSC 509. Trends in Music Education. 3 Credits.
An overview of historical and contemporary trends in music education. S, even years.

MUSC 511. Chamber Music Literature. 3 Credits.
An historical overview of piano chamber music literature incorporating reading, listening, score study and analysis.

MUSC 512. Diction for Singers. 1 Credit.
Rules for and practical application of two of the major languages used in art song literature: Italian/English or French/German. May be repeated for credit up to 2 hours. F, odd years.

MUSC 521. Instrumental Literature. 3 Credits.
The study of instrumental music literature through scores and recordings. F, even years.

MUSC 522. Graduate Applied Music Literature. 2-3 Credits.
The advanced study, analysis, and history of solo and/or chamber music literature relevant to the student's major instrument. Various topics. Repeatable to 6 credits. F, odd years.

MUSC 523. Keyboard Literature. 2-3 Credits.
This course is designed to introduce pianists to the keyboard literature from pre-Baroque to present day. S, even years.

MUSC 524. Choral Literature. 3 Credits.
The study of choral literature through scores and recordings. F, odd years.

MUSC 525. Vocal Literature. 3 Credits.
An historical overview of the development of art song and opera including reading, listening, score study and analysis. F, odd years.

MUSC 537. Advanced Studies in Musical Form. 2 Credits.
Advanced study and analysis of the principal forms of musical composition. Prerequisite: Graduate status. F, even years.

MUSC 538. Advanced Orchestration. 2 Credits.
Advanced study of orchestration and arranging techniques for various ensembles and combinations of instruments. Includes the study of exotic instruments. Prerequisite: Graduate status.

MUSC 539. Advanced Counterpoint. 2 Credits.
Advanced study of Counterpoint. Topics may include 16th-century styles, 18th-century styles, and/or 20th-century styles. The course includes both analysis of existing works, and composition of original works. Prerequisite: Graduate status.

MUSC 551. Vocal Pedagogy I. 3 Credits.
Teaching procedures, methods, and literature for teaching voice students from beginning through early intermediate levels, addressing questions of style, performance practices, editions, and techniques. Includes observation and teaching in both group and individual settings. F, even years.

MUSC 552. Keyboard Pedagogy I. 2-3 Credits.
This course is designed to introduce pianists to the art of teaching through discussions, lectures, and assignments which explore teaching techniques, materials, and methods appropriate for the beginning and elementary piano student. S, odd years.

MUSC 553. Vocal Pedagogy II. 3 Credits.
Teaching procedures, methods, and literature for teaching voice students from the late intermediate through advanced levels, addressing questions of style, performance practices, editions, and techniques. Includes observation and teaching in both group and individual settings. Prerequisite: MUSC 551.

MUSC 555. Graduate Applied Music Pedagogy. 2-3 Credits.
Advanced readings, instruction, and application of pedagogical principles and materials relevant to the student's major instrument. Repeatable to 6 credits. F, even years.

MUSC 556. Advanced Choral Conducting. 2 Credits.
Choral schools and composers since the sixteenth century, study of interpretations based on scores, recordings, and class performance. S, odd years.

MUSC 557. Advanced Instrumental Conducting. 2 Credits.
Advanced techniques of instrumental conducting and score reading. S, even years.

MUSC 558. Violin Literature. 3 Credits.
Advanced study of violin literature. Prerequisite: Graduate status. Repeatable up to 4 hours. F.S.

MUSC 559. Piano Literature. 3 Credits.
Advanced study of piano literature. Prerequisite: Graduate status. Repeatable up to 4 hours. F.S.

MUSC 562. Advanced Instrumental Conducting. 2 Credits.
Advanced techniques of instrumental conducting and score reading. S, even years.

MUSC 563. Advanced Vocal Pedagogy. 2 Credits.
Advanced study of vocal pedagogy. Prerequisite: Graduate status. Repeatable up to 2 hours. F.S.

MUSC 567. Advanced Counterpoint. 2 Credits.
Advanced study of Counterpoint. Topics may include 16th-century styles, 18th-century styles, and/or 20th-century styles. The course includes both analysis of existing works, and composition of original works. Prerequisite: Graduate status.

MUSC 570. Advanced Opera Workshop. 1 Credit.
Graduate level staged performance of operatic literature: chamber operas, scenes from larger works, and major productions. Prerequisite: Permission of the instructor. Corequisite: Enrollment in graduate level voice lessons. Repeatable. S.

MUSC 571. Chamber Ensembles. 1 Credit.
Exploration of chamber music works and cultivation of its advanced techniques. The student's progress is evaluated through final jury performance or public performance. Repeatable without limitation. Repeatable. F.S.

MUSC 572. Advanced Music Theory Review. 1-3 Credits.
A comprehensive review of the harmonic, contrapuntal and formal elements of tonal and post-tonal music, designed to prepare students for graduate-level music courses. Credit does not count toward fulfillment of 32-hour minimum. Music graduate degree requirements. May be waived by examination.

MUSC 573. Final Project in Composition. 4 Credits.
The composition and performance of an original musical work of proportions suitable for a final composition project at the master's level.
MUSC 594. Individual Lessons. 1 Credit. Individual lessons in secondary instruments, conducting or voice. In registering for private lessons in voice, piano, organ, conducting or any orchestral instrument, "Voice" or the name of the instrument serves as the title of the course. For the final examination (excluding conducting), the student will perform before a faculty committee. May be repeated for credit without limitation. Repeatable.

MUSC 595. Individual Lessons. 1-2 Credits. Individual lessons in the major instrument for non-performance music degree programs. In registering for private lessons, "Voice" or the name of the instrument serves as the title of the course. For the final examination, the student will perform before a faculty committee. May be repeated for credit without limitation. Prerequisite: Permission of the Instructor. Repeatable. F.S.

MUSC 596. Individual Lessons. 1-4 Credits. Individual lessons in the major instrument for the performance major. In registering for private lessons, "Voice" or the name of the instrument serves as the title of the course. For the final examination, the student will perform before a faculty committee. May be repeated for credit without limitation. Prerequisite: Permission of Instructor. Repeatable. F.S.

MUSC 597. Special Projects. 1-3 Credits. Individual study in an approved area of interest to the student. Repeatable to 30 credits.

MUSC 598. Research in Music Education. 3 Credits. An introduction to qualitative and quantitative research methodology relative to music education. F, even years.

MUSC 599. Graduate Recital. 2 Credits. The presentation of a graduate recital. Recitals may not be given until a recital audition has been reviewed and approved by the applied instructor and the student's master's committee. Music Education students must also complete an associated document. Repeatable to 4 credits. Prerequisite: Consent of instructor. Corequisites: MUSC 595 or MUSC 596. Repeatable to 4 credits. F.S.


MUSC 997. Independent Study. 2 Credits. Independent study and preparation of a written document. Prerequisite: Permission of advisor.

MUSC 998. Thesis. 4 Credits. Prerequisite: Permission of advisor.

MUSC 999. Dissertation. 1-15 Credits. Prerequisite: Permission of advisor. Repeatable to 15 credits.

### Doctor of Philosophy in Music Education

#### Admission Requirements

Admission requirements for the Doctor of Philosophy degree in Music Education are the same as those found under the Teaching and Learning Doctoral Program in Education and are listed below.

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. Graduate grade point average(s) above 3.5.
2. Excellent writing skills.
3. Three references that speak to academic ability, professional accomplishments related to your field of study, and positive character traits.
4. A statement of clear professional goals that can be met by our program as specified in the graduate catalog.
5. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

Recommended: The Graduate Record General Examination (verbal, quantitative, analytical), the Advanced Graduate Record Examination, and/or the Miller Analogies Test.

#### Degree Requirements

Students seeking the Doctor of Philosophy degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Music Department.

Requirements for the Doctor of Philosophy Degree set forth by the Music Department include:

The Ph.D. program of study in Teaching and Learning shall include the following:

1. Completion of 90-96 semester credits beyond the baccalaureate degree.
2. Maintenance of at least a 3.0 GPA for all classes completed as a graduate student.
3. With approval of a student’s Faculty Advisory Committee, up to one-half of the work beyond a master’s degree (maximum of 30 semester credit hours) may be transferred from another institution that offers post-master’s degrees in the discipline.
4. At least one-half of the work must be in the major field, including:
   a. at least 10 credits of dissertation, which incorporates independent work that is an original contribution to knowledge in the field.
   b. A minimum of 6 credits in the Foundations of Education.
   c. A minimum of 12 credits of scholarly tools
5. At least 12 hours of a minor or cognate in a supporting area.
6. Meet one of the three residency options described below:

#### Residency Requirements

The purpose of residency is to provide an opportunity for sustained and concentrated intellectual effort, to provide for immersion in a research environment, and to permit extensive interaction with fellow students and faculty of the major department.

The residency for the Ph.D. in Music Education is designed to provide the student with the experiences outlined by the School of Graduate Studies. Students are expected to engage in serious scholarship and reflect on their learning and experiences, as well as to integrate their doctoral study such that the program of study they pursue will become a unified experience. A doctoral student in Music Education can meet the residency requirement in any one of the following ways:

1. Students will complete a residency while enrolled in a minimum of nine semester hours of credit during each of two consecutive semesters (Fall/Spring or Spring/Fall). Students in this option are encouraged, but are not required, to enroll in a Doctoral Seminar during their residency or at another time in the program. If a student is a GTA, GSA or GRA, the number of credits that the student may take for this option is less and is specified in the catalog.
2. Students will complete a residency while enrolled in a minimum of eight semester hours of credit during each of three consecutive summer sessions and in a minimum of two Doctoral Seminars following their first and second or third summers in residence.
3. Students will complete a residency over a period of three consecutive years of continuous enrollment in a minimum of 36 hours of credit (12 credits per year for three years), to include a minimum of two Doctoral Seminars during the period of residency.

Core Courses listed above

#### Music Education Component

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUSC 503</td>
<td>Psychological Foundations of Music Learning</td>
</tr>
<tr>
<td>MUSC 507</td>
<td>Foundations of Music Education</td>
</tr>
<tr>
<td>MUSC 999</td>
<td>Dissertation</td>
</tr>
</tbody>
</table>

Music Electives (other studies in Music) 7-23

#### Teaching & Learning Core (minimum of 12 credits)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>T&amp;L 539</td>
<td>College Teaching</td>
</tr>
<tr>
<td>T&amp;L 545</td>
<td>Adult Learners</td>
</tr>
</tbody>
</table>

Teaching & Learning Core Electives (selected from T&L list in consultation with adviser) 6

#### Foundations of Education

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EFR 500</td>
<td>Introduction to the Foundations of Education</td>
</tr>
</tbody>
</table>
**Master of Music in Collaborative Piano**

**Pedagogy or Conducting**

**Master of Music in All Areas of Performance,**

(to be sent directly to the Music Department)

Additional Admission Requirements for the Master of Music degree set forth by the Music Department include:

1. A bachelor's degree with a major in music with competence in the specialty in which graduate study is desired.
2. At least a 2.75 overall GPA and at least a 3.00 GPA for the last two years of undergraduate work.
3. Satisfy the School of Graduate Studies' English Language Proficiency requirements as published in the graduate catalog.

**Admission Requirements**

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

Minimal Admission Requirements for the Master of Music degree set forth by the Music Department include:

1. A bachelor’s degree with a major in music with competence in the specialty in which graduate study is desired.
2. At least a 2.75 overall GPA and at least a 3.00 GPA for the last two years of undergraduate work.
3. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

**Additional Admission Requirements for Specific Degrees**

(to be sent directly to the Music Department)

**Master of Music in All Areas of Performance, Pedagogy or Conducting**

1. Audition on the major performing instrument or voice on campus, via virtual live audition, or by live recording of a recent performance.
   a. Coordinate directly with the applied instructor or area conductor (choral or instrumental).
2. Repertoire list of works studied and/or conducted or studied and/or performed on the major performing instrument or voice.
3. Additionally, for Vocal Pedagogy and Vocal Performance: Performance resume; evidence of two years’ satisfactory study of French, German, or Italian; and knowledge of the lyric diction of all three.

**Master of Music in Collaborative Piano**

1. Audition on campus, via virtual live audition, or by live recording of a recent performance.
   a. Coordinate directly with the applied piano instructor. If auditioning on campus, you must supply your own partners.
2. Resume detailing education and collaborative piano experience.

**Scholarly Tools in Education**

**(may serve as Research cognate, 3 options, see below)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUSC 503</td>
<td>Psychological Foundations of Music Learning (listed above)</td>
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</tr>
<tr>
<td>MUSC 507</td>
<td>Foundations of Music Education (listed above)</td>
<td>3</td>
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</table>

**Supporting Area and Electives**

**(may include Minor, 24 credits or Cognate, 12 credits)**

<table>
<thead>
<tr>
<th>Course</th>
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<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EFR 510</td>
<td>Qualitative Research Methods</td>
<td>3</td>
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<tr>
<td>EFR 520</td>
<td>Advanced Qualitative Research Methods</td>
<td>3</td>
</tr>
<tr>
<td>EFR 516</td>
<td>Statistics II</td>
<td>3</td>
</tr>
<tr>
<td>MUSC 598</td>
<td>Research in Music Education</td>
<td>3</td>
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</table>

**Scholarly Tools Options (courses below or equivalents)**

<table>
<thead>
<tr>
<th>Option</th>
<th>Title</th>
<th>Credits</th>
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</thead>
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<tr>
<td>1</td>
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<td>Quantitative Emphasis Option</td>
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<tr>
<td>3</td>
<td>Tests and Measurements Option</td>
<td>9</td>
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**Option 1: Qualitative Emphasis Option**

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</thead>
<tbody>
<tr>
<td>EFR 510</td>
<td>Qualitative Research Methods</td>
<td>3</td>
</tr>
<tr>
<td>EFR 516</td>
<td>Statistics II</td>
<td>3</td>
</tr>
<tr>
<td>MUSC 598</td>
<td>Research in Music Education</td>
<td>3</td>
</tr>
</tbody>
</table>

Or equivalents

**Option 2: Quantitative Emphasis Option**

<table>
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<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>EFR 510</td>
<td>Qualitative Research Methods</td>
<td>3</td>
</tr>
<tr>
<td>EFR 516</td>
<td>Statistics II</td>
<td>3</td>
</tr>
<tr>
<td>MUSC 598</td>
<td>Research in Music Education</td>
<td>3</td>
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</tbody>
</table>

Or equivalents

**Option 3: Tests and Measurements Option**

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<th>Course</th>
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<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>EFR 511</td>
<td>Program Evaluation</td>
<td>3</td>
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<tr>
<td>EFR 512</td>
<td>Survey and Test Design</td>
<td>3</td>
</tr>
<tr>
<td>EFR 516</td>
<td>Statistics II</td>
<td>3</td>
</tr>
<tr>
<td>MUSC 598</td>
<td>Research in Music Education</td>
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</tr>
</tbody>
</table>

**Degree Requirements - M.M. and Ph.D.**

All Graduate Music degree programs (M.M. & Ph.D.) require the following Core Courses:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>MUSC 500</td>
<td>Introduction to Graduate Study in Music</td>
<td>3</td>
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<tr>
<td>MUSC 502</td>
<td>Perspectives in Music Theory</td>
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</tr>
<tr>
<td>MUSC 508</td>
<td>Perspectives of Music History</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 9

**Degree Requirements - M.M.**

Students seeking the Master's degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Music Department.

Degree requirements for the Master of Music degree in Music Department include:

1. 32-38 credit hours in one of the available seven specializations:
   a. Music Education
   b. Performance
   c. Vocal Pedagogy
   d. Composition
   e. Choral Conducting
   f. Instrumental Conducting
   g. Collaborative Piano
2. At least one-half of the credits must be at or above the 500-level.
3. The specialization in Conducting requires at least a one-year residence.

**Music Education Specialization**

**Independent Study Option**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>MUSC 503</td>
<td>Psychological Foundations of Music Learning</td>
<td>3</td>
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<tr>
<td>MUSC 509</td>
<td>Trends in Music Education</td>
<td>3</td>
</tr>
<tr>
<td>MUSC 598</td>
<td>Research in Music Education</td>
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</tr>
<tr>
<td>MUSC 997</td>
<td>Independent Study (Music Education topic)</td>
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</table>

Electives in Music Education 6

Electives (from outside Music Education, may be from outside the Department of Music) 6-12

Total Credits 32-38

**Thesis Option**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>MUSC 503</td>
<td>Psychological Foundations of Music Learning</td>
<td>3</td>
</tr>
<tr>
<td>MUSC 509</td>
<td>Trends in Music Education</td>
<td>3</td>
</tr>
<tr>
<td>MUSC 598</td>
<td>Research in Music Education</td>
<td>3</td>
</tr>
<tr>
<td>MUSC 998</td>
<td>Thesis (Music Education Topic)</td>
<td>4</td>
</tr>
</tbody>
</table>

Total Credits 9
Electives in Music Education 6
Electives (from outside Music Education, may be from outside the Department of Music) 4-10

Total Credits 32-38

**Performance Option**

Core Courses listed above 9

**Music Education Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>MUSC 503</td>
<td>Psychological Foundations of Music Learning</td>
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<tr>
<td>MUSC 509</td>
<td>Trends in Music Education</td>
</tr>
<tr>
<td>MUSC 598</td>
<td>Research in Music Education</td>
</tr>
</tbody>
</table>

Electives in Music Education 6

**Applied Music & Recital (may include conducting)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUSC 595</td>
<td>Individual Lessons (conducting students 1 credit, all others 4 credits)</td>
</tr>
<tr>
<td>MUSC 599</td>
<td>Graduate Recital</td>
</tr>
</tbody>
</table>

**Conducting Courses (required for conducting students only)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUSC 521</td>
<td>Instrumental Literature</td>
</tr>
<tr>
<td>MUSC 524</td>
<td>Choral Literature</td>
</tr>
<tr>
<td>MUSC 561</td>
<td>Advanced Choral Conducting</td>
</tr>
<tr>
<td>MUSC 562</td>
<td>Advanced Instrumental Conducting</td>
</tr>
</tbody>
</table>

Electives (from outside Music Education, may be from outside the Department of Music) 0-8

Total Credits 32-38

**Teacher Education Option**

Prerequisite Degree: B.A., B.S., or B.M. in Music or Music Therapy

Core Courses listed above 9

**Music Education Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUSC 503</td>
<td>Psychological Foundations of Music Learning</td>
</tr>
<tr>
<td>MUSC 509</td>
<td>Trends in Music Education</td>
</tr>
<tr>
<td>MUSC 598</td>
<td>Research in Music Education</td>
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</table>

**Conducting Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUSC 521</td>
<td>Instrumental Literature</td>
</tr>
<tr>
<td>MUSC 524</td>
<td>Choral Literature</td>
</tr>
<tr>
<td>MUSC 561</td>
<td>Advanced Choral Conducting</td>
</tr>
<tr>
<td>MUSC 562</td>
<td>Advanced Instrumental Conducting</td>
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</table>

**Methods Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUSC 440</td>
<td>Methods and Materials for Elementary Music</td>
</tr>
<tr>
<td>MUSC 441</td>
<td>Methods and Materials for Middle and Secondary School Music</td>
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**Recital**

<table>
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<th>Course</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>MUSC 599</td>
<td>Graduate Recital</td>
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</table>

Undergraduate coursework to fulfill licensure requirements

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>MUSC 140</td>
<td>Methods: Woodwinds, Brass, Strings, Percussion, Voice</td>
</tr>
<tr>
<td>MUSC 150</td>
<td>Class Lessons (voice and/or guitar)</td>
</tr>
<tr>
<td>MUSC 180</td>
<td>Introduction to Music Therapy</td>
</tr>
<tr>
<td>MUSC 242</td>
<td>Diction for Singers (choral specialization)</td>
</tr>
<tr>
<td>MUSC 340</td>
<td>Introduction to Music Technology</td>
</tr>
<tr>
<td>MUSC 423</td>
<td>Instrumental and Choral Arranging</td>
</tr>
<tr>
<td>MUSC 427</td>
<td>Analysis of Musical Form</td>
</tr>
<tr>
<td>MUSC 444</td>
<td>Applied Music Pedagogy (choral)</td>
</tr>
<tr>
<td>MUSC 445</td>
<td>Choral Methods</td>
</tr>
<tr>
<td>MUSC 446</td>
<td>Instrumental Classroom Methods and Materials</td>
</tr>
<tr>
<td>T&amp;L 250</td>
<td>Introduction to Education</td>
</tr>
<tr>
<td>T&amp;L 252</td>
<td>Child Development</td>
</tr>
<tr>
<td>T&amp;L 386</td>
<td>Field Experience</td>
</tr>
<tr>
<td>T&amp;L 433</td>
<td>Multicultural Education</td>
</tr>
<tr>
<td>T&amp;L 486</td>
<td>Field Experience</td>
</tr>
<tr>
<td>T&amp;L 487</td>
<td>Student Teaching</td>
</tr>
</tbody>
</table>

T&L 488 Senior Seminar 1

Total Credits 67-85

All students must demonstrate keyboard proficiency equivalent to level 4; keyboard principals must demonstrate an equivalent level of vocal proficiency.

Some 300 and 400 level courses may be permitted to fulfill graduate elective requirements, subject to School of Graduate Studies academic policies.

**Performance Specialization**

Core Courses listed above 9

**Performance Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>MUSC 596</td>
<td>Individual Lessons</td>
</tr>
<tr>
<td>MUSC 599</td>
<td>Graduate Recital</td>
</tr>
<tr>
<td>MUSC 997</td>
<td>Independent Study</td>
</tr>
</tbody>
</table>

**Other Studies**

Electives 3-9

**Voice Major**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>MUSC 525</td>
<td>Vocal Literature</td>
</tr>
<tr>
<td>MUSC 551</td>
<td>Vocal Pedagogy I</td>
</tr>
<tr>
<td>MUSC 581</td>
<td>Graduate Opera Workshop</td>
</tr>
</tbody>
</table>

**Piano Major**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>MUSC 523</td>
<td>Keyboard Literature</td>
</tr>
<tr>
<td>MUSC 552</td>
<td>Keyboard Pedagogy I</td>
</tr>
<tr>
<td>MUSC 578</td>
<td>Seminar for Collaborative Piano</td>
</tr>
<tr>
<td>MUSC 579</td>
<td>Chamber Ensembles (on Primary Instrument)</td>
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**Instrumental Major**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>MUSC 522</td>
<td>Graduate Applied Music Literature</td>
</tr>
<tr>
<td>MUSC 555</td>
<td>Graduate Applied Music Pedagogy</td>
</tr>
<tr>
<td>MUSC 570</td>
<td>Instrumental Ensemble Performance (Instrumental Major)</td>
</tr>
<tr>
<td>MUSC 579</td>
<td>Chamber Ensembles (Instrumental Major)</td>
</tr>
</tbody>
</table>

**Vocal Pedagogy Specialization**

Core Courses listed above 9

**Pedagogy Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>MUSC 551</td>
<td>Vocal Pedagogy I</td>
</tr>
<tr>
<td>MUSC 553</td>
<td>Vocal Pedagogy II</td>
</tr>
<tr>
<td>MUSC 590</td>
<td>Internship in Music</td>
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</tbody>
</table>

**Other Studies**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>MUSC 525</td>
<td>Vocal Literature</td>
</tr>
<tr>
<td>MUSC 596</td>
<td>Individual Lessons</td>
</tr>
<tr>
<td>MUSC 597</td>
<td>Special Projects (Pedagogy topic)</td>
</tr>
<tr>
<td>MUSC 997</td>
<td>Independent Study</td>
</tr>
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</table>

Electives 5-10

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUSC 581</td>
<td>Graduate Opera Workshop</td>
</tr>
</tbody>
</table>

Total Credits 33-38

**Music Composition Specialization**

Core Courses listed above 9

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>MUSC 506</td>
<td>Advanced Composition</td>
</tr>
<tr>
<td>MUSC 537</td>
<td>Advanced Studies in Musical Form</td>
</tr>
<tr>
<td>MUSC 538</td>
<td>Advanced Orchestration</td>
</tr>
<tr>
<td>MUSC 539</td>
<td>Advanced Counterpoint</td>
</tr>
<tr>
<td>MUSC 593</td>
<td>Final Project in Composition</td>
</tr>
</tbody>
</table>

Electives 5-11

Total Credits 32-38

For those in the composition concentration, the final project in composition replaces an independent study.
Choral Conducting Specialization

Core Courses listed above 9

Conducting Courses
MUSC 561 Advanced Choral Conducting 2
MUSC 562 Advanced Instrumental Conducting 2
MUSC 595 Individual Lessons (Conducting) 2
MUSC 599 Graduate Recital (Conducting) 2

Other Studies
MUSC 524 Choral Literature 3
MUSC 551 Vocal Pedagogy I 3
MUSC 580 Choral Ensemble Performance 2
MUSC 594 Individual Lessons (Voice) 2
MUSC 997 Independent Study 2

Electives 3-9

Total Credits 32-38

Instrumental Conducting Specialization

Core Courses listed above 9

Conducting Courses
MUSC 561 Advanced Choral Conducting 2
MUSC 562 Advanced Instrumental Conducting 2
MUSC 595 Individual Lessons (Conducting) 2
MUSC 599 Graduate Recital (Conducting) 2

Other Studies
MUSC 521 Instrumental Literature 3
MUSC 570 Instrumental Ensemble Performance 2
MUSC 594 Individual Lessons (Instrumental) 2
MUSC 997 Independent Study 2

Electives 6-12

Total Credits 32-38

Collaborative Piano Specialization

Core Courses listed above 9

Other Courses
MUSC 511 Chamber Music Literature 3
MUSC 512 Diction for Singers 2
MUSC 525 Vocal Literature 3
MUSC 578 Seminar for Collaborative Piano 1
MUSC 579 Chamber Ensembles 2
MUSC 592 Individual Lessons: Collaborative Piano 8
MUSC 599 Graduate Recital 2
MUSC 997 Independent Study 2

Electives 0-6

Total Credits 32-38

Nursing

Doctor of Nursing Practice (http://und-public.coursesleaf.com/graduateacademicinformation/departmentalcoursesprograms/nursing/nur-dnp)

Ph.D. in Nursing (http://und-public.coursesleaf.com/graduateacademicinformation/departmentalcoursesprograms/nursing/doctorofnursing/phd)

Courses

NURS 500. Theories/Concepts Nursing. 3 Credits.
The focus of this core course is on analysis of current nursing and related theories and concepts which guide clinical practice, curriculum development, research, and nursing administration.

NURS 502. Evidence for Practice. 3 Credits.
This course emphasizes the application of basic research concepts to the building of evidence-based practice in nursing. Advanced competencies are developed in searching and evaluating the literature, examining the merit of different types and levels of evidence, and analyzing the generalizability and implications for clinical practice. Prerequisites or Corequisites: Admission to one of the Graduate Nursing Tracks, NURS 500 and statistics and/or permission of instructor. F,S.

NURS 503. The Business of Practice. 2 Credits.
This course focuses on the business aspects of Inter-professional advanced practice in the complex health care environment. Prerequisite: Admission to the DNP Program.

NURS 504. Advanced Pharmacology I. 3 Credits.
Pharmacodynamic and pharmacokinetic principles with a focus on clinical anesthesia practice. Physiologic systems and drug classifications are used; emphasis on therapeutic use, side effects, drug interactions, and contraindications of drugs used for intravenous anesthesia induction, inhalation, and balanced anesthesia maintenance. Pediatric and geriatric variations will be addressed. Prerequisite: Admission to Nurse Anesthesia Specialization.

NURS 505. Advanced Pharmacology. 3 Credits.
The focus of this course is on the basic and advanced clinical concepts of pharmacology for the advanced practice nurse. Medication selection and administration will be addressed. Anatomy, physiology, and pathophysiology will be reviewed as appropriate to the physiologic system or medication class being discussed. Evidence-based guidelines with respect to the clinical application of medications utilized in selected acute and chronic health problems will be explored. Prerequisite or Corequisite: Admission to Graduate Nursing Program.

NURS 506. Advanced Pharmacology II. 3 Credits.
Advanced pharmacology for clinical nurse anesthesia practice. Prerequisite: NURS 504.

NURS 507. Anesthesia Seminar and Clinical Practicum. 4 Credits.
This course is designed to provide nurse anesthesia students an overview of the basic principles and skills needed to care for the routine surgical patient. Topics include difficult airway management, patient monitoring, patient preparation, positioning, patient safety, fluid and electrolyte management, documentation of anesthesia care, and an introduction to regional anesthesia. Analysis, integration, and utilization of research to improve practice is emphasized. The lecture content is reinforced through Clinical Simulation and laboratory experiences, allowing for immediate application of the lecture content and integration into the clinical setting. Students are introduced to the clinical setting through observational and hands-on experiences. Includes a clinical and/or laboratory component. Prerequisite: NURS 521.

NURS 508. Nurse Anesthesia Review Course. 1 Credit.
This course is faculty guided and designed to assist students with their review of nurse anesthesia course and clinical material in preparation for the CCNA certification examination. Prerequisite: Completion of all Nurse Anesthesia Specialization coursework.

NURS 509. Foundations for Nurse Education. 3 Credits.
This course begins to compare and contrast multiple roles and responsibilities of nurse educators in various settings in academic and health service. It will build the conceptual foundation for educational processes with emphasis on ethics, learning theories, taxonomies of learning and current evidence necessary for development of competencies necessary for the practice of educating. Students will begin to formulate their individual philosophy of teaching and learning. Prerequisite: Admission to the Nursing Graduate Program or consent of the instructor. Prerequisite or Corequisite: NURS 500. S.

NURS 510. Adv Physiology/Pathophysiology I. 3 Credits.
Normal physiologic functions associated with cellular structure and environment. Physiologic and pathophysiologic functions of the human body and its organ systems, both separately and integrated in whole activities. Prerequisite: Admissions to graduate study.

NURS 511. Adv Physiology/Pathophys II. 3 Credits.
Physiologic and pathophysiologic functions of the human body and its organ systems, both separately and integrated in whole activities. Prerequisite: NURS 510 or consent of instructor.

NURS 512. DNP Core Concepts I. 2 Credits.
This course is an exploration of the core concepts that support the developing role of the DNP as a practice focused leader and researcher. Prerequisite: Admission to the DNP Program.
NURS 513. DNP Core Concepts II. 2 Credits.
This course focuses on the concepts that support the development of the role of the DNP practice leader in the care of rural and vulnerable populations and issues related to planning and providing care for vulnerable and underserved populations. The primary content focus areas are epidemiology and vulnerability related to population and individual health. Prerequisites: Admission to the DNP Program and NURS 512. S.

NURS 514. Essentials in Epidemiology. 3 Credits.
This course will emphasize the application of the principles of epidemiology as applied to the investigation and prevention of individual and population health problems. Students will evaluate care delivery models and analyze epidemiological data to develop and apply strategies for health promotion and disease prevention for individuals, aggregates, and populations. The core competencies will focus not only on the practice of public health, but also enhance practice for the clinician. Prerequisite: Admission to the Graduate School, MPH Program, or permission of the instructor. F. S.

NURS 515. Basic Principles of Anesthesia Practice I. 3 Credits.
This course provides an introduction to the fundamental principles necessary for the safe, professional, and individualized anesthetic care of diverse patients. Foundational concepts such as chemistry and physics as they apply to anesthesia practice, pharmacology of anesthetic agents, uncomplicated airway management, anesthesia delivery systems, and physiological monitoring will be investigated. Low and high fidelity patient simulation will be utilized to develop the student's cognitive and psychomotor skills which are essential to clinical anesthesia management. The course will conclude with a clinical component designed to acclimate beginning nurse anesthesia students to the clinical anesthesia arena. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. F.

NURS 516. Basic Principles of Anesthesia Practice II. 3 Credits.
This course builds upon the fundamentals covered in Basic Principles of Anesthesia I, all of which are necessary for the safe, professional, and individualized anesthetic care of diverse patients. Concepts such as basic perioperative anesthetic management, pain management, regional anesthesia, difficult airway management, effective oral and written communication, and patient and healthcare provider safety are emphasized. Low and high fidelity patient simulation will be utilized to develop the student’s cognitive and psychomotor skills which are essential to clinical anesthesia management. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S.

NURS 517. Anesthesia Seminar and Clinical Practicum II. 5 Credits.
This course builds on the foundations learned in the prerequisite course. Advanced anesthesia principles are applied to various patient populations including the surgical patient with cardiovascular and respiratory diseases. Anesthesia care of other surgical populations including the trauma, orthopedic, urological, vascular, intra-abdominal and ENT patient will be explored. Important concepts include anatomical, physiological and pathophysiological, and pharmacological principles. Analysis, integration, and utilization of research to improve practice is emphasized. The lecture content is reinforced through simulated laboratory experiences, allowing for immediate application of the lecture content and integration into the clinical setting. A clinical rotation is included. Prerequisite: NURS 507.

NURS 518. Pharmacotherapeutics for Nurse Anesthesia. 2 Credits.
The focus of this course is on advanced clinical concepts of pharmacology relevant to the nurse anesthetist during the perioperative period. This course utilizes concepts from NURS 505 Advanced Pharmacology and further advances the student’s knowledge in pharmacological concepts related to the practice of anesthesia. This course will examine the clinical application of anesthesia specific pharmacologic principles into formulating anesthetic plans for diverse patient populations. Prerequisite or Corequisite: NURS 505; Admission to the DNP Program - Nurse Anesthesia Track. S.

NURS 519. Practice Leadership. 2 Credits.
This course focuses on practice leadership theories and strategies related to the role of the DNP advanced practice nurse within the complex health care system. Prerequisite: Admission to DNP Program or consent of instructor.

NURS 520. Prof Role Dvlpmnt/Nurse Ansthsia. 3 Credits.
The focus of this course is on the identification and analysis of the professional components of nurse anesthesia practice, emphasizing role development; management and leadership; medical, ethical and legal responsibilities; the provision of culturally competent care; and scope of professional practice. Other areas that will be explored include quality improvement, the legislative process, credentialing, professional organizations, conflict resolution, and self-care and stress management for the anesthetist. An in-depth analysis of current trends and issues affecting healthcare and the delivery of anesthesia services are included in the course content. Prerequisites: NURS 521 and NURS 507. Corequisite: NURS 517.

NURS 521. Foundations of Anesthesia Practice. 3 Credits.
This course provides the foundation for nurse anesthesia practice. Lecture and discussion begin with an analysis of the history of anesthesia nursing, professionalism, and standards of care for the anesthetist. Safety in the nurse anesthesia environment will be emphasized. Additional content includes the applied chemical, physical, and biochemical concepts as they relate to anesthesia practice, including the mechanisms of anesthesia, medical mathematics, medical gas systems, laws governing gases, the anesthesia machine, monitoring principles and equipment, airway equipment and basic airway management, and universal precautions. Prerequisite: Admission to the Nurse Anesthesia Specialization.

NURS 522. Advanced Pathophysiology. 3 Credits.
This course presents a system-focused approach to alterations in normal physiological mechanisms that result in pathologic disease processes. Physiological changes are compared and contrasted over the lifespan and developmental cellular physiology, pathogenesis and clinical manifestations commonly observed in altered health states are reviewed. This knowledge serves as the foundation for advanced clinical assessment, decision making and management for the advanced practice nurse. Prerequisite: Admission to graduate study. F. S. SS.

NURS 523. Health Promotion. 3 Credits.
Paradigms in health promotion, health detection, and disease prevention across the lifespan are used in synthesis in theory and evidence-based primary care interventions. Prerequisite: Admission to the Nursing Graduate Program or consent of the instructor. F. S.

NURS 524. Anatomy for Nurse Anesthetists. 1 Credit.
This course builds upon the concepts and fundamentals of Basic Principles of Anesthesia I and II as it relates to the detailed regional anatomy of the human body. A cadaver laboratory experience will be utilized throughout the course to develop the student's understanding of clinical anatomy related to the airway, central nervous system, peripheral nerves, cardiovascular system, and pulmonary system with an anesthesia context. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S.

NURS 525. Applied Multivariate Statistics. 3 Credits.
Principles, assumptions and applications of major multivariate statistical techniques commonly used in nursing and clinical health research. Prerequisite: Graduate level univariate statistics and admission to the Nursing Doctoral Program or consent of the instructor. F.

NURS 526. Ethical, Legal and Health Policy Issues. 3 Credits.
This course emphasizes health policy issues within the context of legal and ethical concepts. Students will examine and debate health policies in current practice, thus broadening their ability to analyze, implement, and evaluate health policy issues.

NURS 527. Anesthesia Seminar and Clinical Practicum III. 5 Credits.
This course further builds on the foundations learned in prerequisite courses. Students will incorporate previously learned anatomy, physiology, pathophysiology, and patient management into the care of subspecialty patients and patients with complex co-existing diseases. Advanced anesthesia principles are applied to the OB, pediatric, geriatric, and neuro patient. The pharmacology and anesthesia management of these subspecialty populations and patients with various disease states, such as kidney, musculoskeletal, and endocrine disorders, will be explored. Analysis, integration, and utilization of research to improve clinical practice is emphasized. The lecture content is reinforced with a clinical experience that emphasizes anesthesia care for subspecialty populations. A clinical/laboratory component is included. Prerequisite: NUR 517.
NURS 528. Advanced Principles of Anesthesia Practice I. 4 Credits.
This course builds upon the nurse anesthesia foundations covered previously in the Basic Principles of Anesthesia I and II courses. An evidence-based approach to the anesthetic evaluation, planning, and management of diverse and increasingly complex patient populations, such as those with pre-existing respiratory, cardiac, and renal diseases, will be the focus. The hands-on administration of safe, individualized, and comprehensive anesthetic plans of care to both simulated and actual patients will be introduced and emphasized. Low and high fidelity patient simulation will be utilized to continue developing the student's cognitive and psychomotor skills which are essential to perform clinical anesthesia management. A clinical component will allow the student to apply theoretical principles to nurse anesthesia practice and to increase their clinical skills, knowledge, and autonomy. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. SS.

NURS 529. Advanced Principles of Anesthesia Practice II. 6 Credits.
This course builds on the foundations covered in Basic Principles of Anesthesia I and II along with Advanced Principles I including the evaluation, planning, and management of diverse and increasingly complex patient populations. Evidence-based advanced principles of anesthesia care will be investigated in order to construct and implement comprehensive and individualized anesthetic plans of care for the management of subspecialty patients. Obstetrical and pediatric populations, as well as patients with complex co-existing diseases and/or those undergoing complex surgical procedures will be the focus. Low and high fidelity patient simulation will be utilized to continue developing the student's cognitive and psychomotor skills which are essential to perform clinical anesthesia management. A clinical component will allow the student to apply theoretical principles to nurse anesthesia practice and to increase their clinical skills, knowledge, and autonomy. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. F.

NURS 530. Research Design & Methods in Nursing. 3 Credits.
Prerequisite or corequisite: NURS 500 or consent of instructor.

NURS 531. Adult-Gerontology Illness Management I. 3 Credits.
This is the first of a two-course sequence that focuses on evidenced-based primary care diagnosis and management of common episodic/chronic problems encountered by young adults, adults, and older adults and their social network in ambulatory, inpatient, and community settings. Physiological, psychosocial, and pharmacological interventions are integrated into the holistic care that incorporates age-related, cultural, family, and community variations. An on-campus intensive is required for this course. Prerequisites: NURS 511 and NURS 585. Corequisite: NURS 597. F.

NURS 532. Family Centered Advanced Practice Nursing. 3 Credits.
Theoretical and scientific foundations for advanced practice nursing care for the family-as-a-unit in health and illness across the lifespan. Prerequisite: Admission to DNP program or consent of instructor. S.

NURS 533. Adult-Gerontology Illness Management II. 3 Credits.
This is the second of a two-course sequence that focuses on evidenced-based primary care diagnosis and management of common episodic/chronic problems encountered by young adults, adults, and older adults and their social network in ambulatory, inpatient, and community settings. Physiological, psychosocial, and pharmacological interventions are integrated into the holistic care that incorporates age-related, cultural, family, and community variations. An on-campus intensive is required for this course. Prerequisite: NURS 531. Corequisite: NURS 597. S.

NURS 534. Management of Health Conditions in Primary Care I. 3 Credits.
This is the first of a two-course sequence that focuses on evidenced-based primary care diagnosis and management of common episodic/chronic problems encountered by adults, including young adults, middle aged adults and older adults and their social network in ambulatory, inpatient, and community settings. Physiological, psychosocial, and pharmacological interventions are integrated into the holistic care that incorporates age-related, cultural, family, and community variations. Prerequisites: NURS 522 and NURS 585. Corequisite: NURS 597 (II). F,SS.

NURS 535. Advanced Pharmacology for Primary Care I. 2 Credits.
Pharmacological agents utilized to treat common acute and chronic health problems are explored in depth. The course focus is on advanced nursing practice roles related to prescription, pharmacological, and therapeutic applications of the drugs. Prerequisite: Admission to the Nursing Graduate Program or consent of the instructor. Prerequisite or corequisite: NURS 510. F,S.

NURS 536. Advanced Nurse Educator Practice of Health Promotion. 2 Credits.
This practical course affords the Nurse Educator student with opportunities to develop advanced skills in teaching-learning practices in the rural health care environments. The student will apply educational theories and best-evidence teaching strategies with a particular emphasis in education related to health promotion strategies. This course will include topics such as the Nurse Educator role for health promotion in rural communities, assess health literacy, and develop appropriate patient educational materials. The practicum emphasizes health promotion education to meet diverse needs of rural dwelling patients, families and groups. Prerequisites: NURS 500, NURS 511, NURS 539, and NURS 514. Corequisite: NURS 526, and NURS 569. F.

NURS 537. Graduate Cooperative Education. 1-2 Credits.
The course focus is upon experience in advanced nursing practice integrating theory, research, and advanced practice in a specific area of nursing. Course overview: the purpose of this course is to provide the graduate nursing student with advanced nursing practice as an employee in a health care agency and to evaluate that experience in relation to the educational program. A clinical/laboratory component is included. Prerequisite: Permission of Graduate Director of Nursing. Repeatable to 9 credits.

NURS 538. Psych Diagnostic Reasoning. 2 Credits.
This course prepares students for advanced therapeutic communication, interviewing, and assessment of people with mental illness across the life span. Skills are developed in differential diagnoses of psychopathology within the scope and standards of advanced psychiatric mental health nursing practice. Clinical application is included. Prerequisite: Acceptance into the PMHNP program or permission of instructor. S.

NURS 539. Advanced Pharmacology for Primary Care II. 2 Credits.
Pharmacological agents utilized to treat common acute and chronic health problems are explored in depth. The course focus is on advanced nursing practice roles related to prescription, pharmacological, and therapeutic applications of the drugs. Prerequisite: Admission to nursing graduate program and NURS 535 or consent of instructor. F,S.

NURS 540. Management of Health Conditions in Primary Care II. 3 Credits.
Clinical decision making skills are developed in the diagnosis and management of acute and chronic health conditions throughout the lifespan. Health promotion, health protection, and disease prevention are emphasized. Prerequisite: NURS 534. F,SS.

NURS 541. Illness Management - Adult Gerontology I. 3 Credits.
This is the first of a two-course sequence focusing on evidence-based primary care specific to the adult-gerontology population which includes adolescents, young adults and frail, older adults. This course prepares students to provide healthcare services across the adult-gerontology age spectrum from wellness to illness, using scientific knowledge and theoretical foundations to differentiate between normal and abnormal changes in physiological, psychological and sociological development and aging. Students will develop strategies to provide and coordinate interdisciplinary and holistic care that incorporates age-related, cultural, family, and community variations. Prerequisites: NURS 522, NURS 585, and NURS 597 (I). Corequisite: NURS 597 (II). F,SS.

NURS 542. Professional Aspects of Nurse Anesthesia Practice. 3 Credits.
This course provides the entry-level nurse anesthesia student with a foundational knowledge of professional aspects related to nurse anesthesia practice. The focus of this course is on historical perspectives, professional role development, anesthesia business practices, and professional wellness. Prerequisite: Admission to the DNP Program - Nurse Anesthesia Track. F.

NURS 543. Illness Management - Adult Gerontology II. 3 Credits.
This is the second of a two-course sequence that focuses on evidence-based primary care specific to the adult-gerontology populations which includes adolescents and young adults to frail, older adults. Course work focuses on evidence based acute and chronic care diagnosis and management of common episodic acute and chronic problems encountered by the adult-gerontological population. Physiological, psychosocial, and pharmacological assessment, including changes associated with aging and development across the adolescent - adult continuum are integrated into the formation of differential diagnosis and interventions of clinical problems in collaboration with other care providers. Prerequisites: NURS 541 and NURS 597 (II). Corequisite: NURS 597 (III). F,SS.
NURS 544. Pharmacotherapeutics for Primary Care. 2 Credits.
This course will help prepare the advance practice nursing student for
prescriptive authority. Topics will focus on decision making regarding the
pharmacological management of common acute and chronic illnesses
encountered in primary care settings. Pharmacokinetics, pharmacodynamics,
adverse drug reactions, and contraindications will be discussed. Ethical and
legal principles of writing prescriptions will also be covered. Students will
synthesize research findings related to various medications using case study
and discussion. Prerequisites: Admission to DNP program (FNP, AGNP tracks),
and NURS 505. S.

NURS 545. Care of the Frail Older Adult. 3 Credits.
In this course the advanced practice nursing student will focus on the complex
and multifactorial health care needs of frail elders. Students will develop
strategies to provide and coordinate interdisciplinary and holistic care of the
frail elderly in a variety of settings. Prerequisite: Admission to DNP program or
consent of instructor. S.

NURS 546. Advanced PHN I. 4 Credits.
NURS 546 introduces concepts foundational to advanced PHN practice and
population health. Corequisite: NURS 547.

NURS 547. Advanced PHN Practicum I. 4 Credits.
The focus of this course is on application of foundational concepts of Advanced PHN practice. Students will conduct a community assessment and identify
community problems and strengths. Written and oral communication skills are emphasized. Corequisite: NURS 546.

NURS 548. Advanced PHN II. 3 Credits.
This course focuses on the leadership role of advanced PHN practice. Public
health and community-based organizational assessment, program monitoring and
evaluation, quality improvement, and management of multiple projects are
emphasized. Concepts of leadership in public and community health and
collaborative interdisciplinary practice are discussed. Health policy and law
and ethics as they relate to public health are explored. In addition, advanced
PHN leadership in rural areas and in disaster/emergency preparedness and
management are discussed. Prerequisites: NURS 502, NURS 546, and
NURS 547. Corequisite: NURS 549.

NURS 549. Advanced PHN Practicum II. 3 Credits.
This course focuses on implementation of advanced PHN interventions.
Corequisite: NURS 548.

NURS 550. Global Public Health Issues. 2 Credits.
This course focuses on population health issues at a global level. Differences in
population health status between developing and developed countries are
explored. Special emphasis is placed on war as a public health issue and the
global impact of AIDS.

NURS 552. Role Development of the CNS. 2 Credits.
Students will compare and contrast the various roles of the clinical nurse
specialist and evaluate those roles as they relate to their individual area of
practice. Concepts of professional development are emphasized. Prerequisite: NURS 502.

NURS 553. Role Development of the NP. 2 Credits.
This course emphasizes professional role development of the nurse practitioner.
Students will compare and contrast the various roles of the nurse practitioner and evaluate those roles as they relate to the student's individual
planned area of practice. Prerequisite: NURS 502.

NURS 554. Writing for Publication. 2 Credits.
The course is designed to provide students with knowledge and skills
necessary to meet the PhD program requirement and milestone of preparing and
submitting a manuscript for publication in a peer-reviewed journal. The
achievement of this milestone is foundational for scientific inquiry and the
development of nurse scientists. Prerequisite: Consent of Instructor or Advisor.
S/U grading. F,S,SS.

NURS 555. Grant Submission. 2 Credits.
The course results in the development and submission of a pre-doctoral,
federally-funded research grant proposal, or equivalent with advisor approval.
The course builds upon previous doctoral coursework covering grantsmanship and
issues in preparing funded research proposals and grant budgets. Prerequisites: NURS 573 and consent of Instructor or Advisor. F,S,SS.

NURS 556. PhD Student Intensive. 1 Credit.
This course submerges the student into a community of scholars during an
annual on-campus intensive experience. The student will participate in a variety
of presentations, workshops, and activities which focus on development into
the role of a nurse scientist and scholar. The course uses a variety of activities
which help the student develop into the role of a nurse scientist and scholar.
Prerequisite: Admission to the Nursing PhD program. Repeatable to 5 credits.
S/U grading. F,S.

NURS 557. Foundations of Nursing Science. 3 Credits.
The epistemology and philosophy of nursing as an art and a science are
examined. Patterns of knowing as well as clinical, conceptual, and empirical
types of nursing knowledge will be discussed. The development of theory as a
knowledge claim is analyzed. Prerequisites: Masters Level Nursing Theory
Course and Admission to PhD Program. S.

NURS 558. Research Design. 3 Credits.
This course prepares the doctoral student to understand the link between
research design and the study purpose. Prerequisite: Admission to PhD program or consent of instructor. F.

NURS 559. Maternal and Child Health in Primary Care. 2 Credits.
This course focuses on advanced practice nursing care of obstetric and
pediatric clients within a primary care setting. An on-campus intensive is
required for this course. Prerequisites: Admission to FNP, NURS 510, NURS 511, NURS 523, and NURS 585. SS.

NURS 560. Clinical Anesthesia Practicum I. 5 Credits.
This is the first of five clinical practicum courses that build upon one another and
provides students the opportunity to obtain the clinical experiences necessary
to develop increasing proficiency in nurse anesthesia practice. The emphasis of this course is the integration of current evidence and advanced
nursing knowledge with decision making and case management for diverse, but
less complex, patient populations receiving anesthesia care. Prerequisite or
Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S/U grading. S.

NURS 561. Clinical Anesthesia Practicum II. 3 Credits.
This is the second of five clinical practicum courses designed to provide the
student with the opportunity to obtain clinical experiences necessary to develop
increasing proficiency in nurse anesthesia practice. The emphasis of this course is the integration of current evidence and advanced nursing knowledge with decision making and case management for the diverse and increasingly
more complex patient populations receiving anesthesia care. Prerequisite or
Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S/U grading. SS.

NURS 562. Clinical Anesthesia Practicum III. 4 Credits.
This is the third of five clinical practicum courses that provides the student with
the opportunity to obtain clinical experiences necessary to develop increasing
proficiency in nurse anesthesia practice. The emphasis of this course is the integration of current evidence and advanced nursing knowledge with decision making and case management for the diverse and increasingly
more complex, patient populations receiving anesthesia care. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S/U grading. F.

NURS 563. Clinical Anesthesia Practicum IV. 6 Credits.
This is the fourth of five clinical practicum courses that provides the student with
the opportunity to obtain clinical experiences necessary to develop increasing
proficiency in nurse anesthesia practice. The emphasis of this course is the integration of current evidence and advanced nursing knowledge with decision making and case management for diverse patient populations, of all acuity levels, receiving anesthesia care. Emphasis will also be placed on student autonomy, continuing professional role development, and leadership
skills. Prerequisite or Corequisite: Admission to the DNP Program - Nurse
Anesthesia Track. S/U grading. S.

NURS 564. Psychopharmacology. 2 Credits.
This course provides the advanced practice student with knowledge in the
pharmacology of psychopathology across the life span. Emphasis will be placed on the appropriate use of pharmaceuticals for psychiatric disabilities/
disorders including: Mood disorders, development disorders, psychotic
disorders, anxiety disorders, dementia, and substance abuse. Prerequisite: Admission to PMHNP program or permission of instructor. S.
NURS 565. Rural Populations and Rural Health. 3 Credits.
This course provides an overview of characteristics of rural populations and rural health. Factors that contribute to health, morbidity, and mortality are examined, and the compounded vulnerability of rurality and disadvantaged groups is analyzed. Prerequisite: A graduate level Epidemiology course or permission of instructor. S.

NURS 566. Curriculum Development. 3 Credits.
This course focuses on the curriculum development process. Societal, professional, and institutional factors as well as current research findings influencing the curriculum development process are analyzed. Consideration of the impact of adult learning principles, workforce issues, legal-ethical concerns, and diverse student populations in regard to the curriculum development process is given. Prerequisite: NURS 509.

NURS 567. Teaching Methodologies. 3 Credits.
The course explores theory-based teaching strategies designed to develop cognitive abilities, psychomotor skills, and affective qualities in learners from diverse backgrounds. Strategies and methods for the teaching of nursing content in a variety of settings are utilized. The use of technological tools in nursing education is evaluated. Prerequisite or corequisite: NURS 566.

NURS 568. Teaching Practicum. 2 Credits.
Students assume the role of the nurse educator in selected learning settings under the guidance of a preceptor. A clinical/laboratory component is included. Prerequisites: NURS 566 and NURS 567 and NURS 569, or consent of instructor.

NURS 569. Assessment and Evaluation. 3 Credits.
Principles of assessment, measurement, and evaluation are analyzed in this course as they relate to nursing education. The processes of assessing student learning, teaching, and program outcomes are explored. Topics relevant to the evaluation of individual student learning such as test development, evaluation of critical thinking, and clinical evaluation are included. The processes of faculty and program evaluation are examined. Prerequisites: NURS 566 and NURS 567, or consent of instructor.

NURS 572. Diverse Vulnerable Populations. 3 Credits.
Students will explore a wide range of concepts as they apply to diverse and vulnerable populations. The focus of the course is on understanding concepts and principles important to nursing when doing research, planning health care, developing health policy, and teaching in this area. Prerequisite: Admission to the Nursing Graduate Program or consent of the instructor.

NURS 573. Research Funding. 3 Credits.
This course integrates the scientific and practical aspects of professional writing and grant proposal development to obtain funds for research. Prerequisite: Admission to the graduate nursing program or approval of instructor. Prerequisite or Corequisite: NURS 574 and/or NURS 575; Non-nursing programs: Graduate level quantitative and/or qualitative research methods coursework required. F.

NURS 574. Quantitative Nursing Methods. 3 Credits.
The purpose of this course is to acquire knowledge and skills necessary to apply quantitative research methods in nursing. The course includes substantial applications of established methodologies and effective research techniques within the quantitative paradigm. Prerequisite: Admission to the doctoral program and completion of a multivariate statistics course. S.

NURS 575. Qualitative Nursing Research. 3 Credits.
This course focuses on examination and analysis of qualitative research designs with particular emphasis on approaches relevant to phenomena in nursing. Students will conduct fieldwork to develop some beginning qualitative research skills. Prerequisite or Corequisite: Admission to Doctoral Program or consent of instructor. F.

NURS 576. Clinical Anesthesia Practicum V. 5 Credits.
This is the final capstone clinical practicum course that provides the student with the opportunity to develop full autonomy and proficiency in nurse anesthesia practice. The emphasis of this course is the integration of current evidence and advanced nursing knowledge with advanced clinical judgement, well developed clinical decision making, and total case management for diverse patient populations receiving anesthesia care. Professionalism and leadership within healthcare systems will be emphasized. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S/U grading. SS.

NURS 577. Rural Healthcare Ethics. 3 Credits.
This course is directed toward the development of critical dialogue and leadership strategies for dealing with ethical issues related to nursing, health care and research. Commitment to discussion, understanding and acceptance of the rights of others in dilemmas is emphasized. Reflexive nursing, which brings attention to one's own position and objectivity, is encouraged. The challenges of ethics in rural milieus are included in the discourse. Prerequisite: Admission to the Nursing doctoral Program or consent of the instructor. S.

NURS 578. Doctoral Seminar. 1 Credit.
Prerequisite: Admission to the Nursing doctoral Program or consent of the instructor.

NURS 580. Research Practicum. 1-6 Credits.
The doctoral research practicum provides a research experience for doctoral nursing students separate from the dissertation to participate in the research process under the guidance of an experienced/funded investigator. Experiences may include grant writing, data collection, analysis, and manuscript writing. Repeatable to 6 credits. F,S,SS.

NURS 581. The Nurse Scientist. 3 Credits.
This course prepares the doctoral student to actively engage in doctoral study with knowledge of the discipline of nursing and skills that facilitate success as an emerging nurse scientist. Prerequisite: Admission to PhD program. F.

NURS 583. Individual Therapy. 2 Credits.
This course provides knowledge and skill development in the implementation of evidence-based clinical therapies and treatments focused on the individual including cultural variations. Includes clinical practice. Prerequisites or corequisites: NURS 500, NURS 502, NURS 510, NURS 511, NURS 514, NURS 523, NURS 535, NURS 538, NURS 539, and NURS 585.

NURS 584. Group and Family Therapies. 3 Credits.
Evidence-based clinical interventions with diverse groups and families are presented. Opportunities for clinical implementation accompany the theoretical models. A clinical/laboratory component is included. Prerequisites or corequisites: NURS 538, NURS 583 and admission into Psychiatric Mental Health specialization or consent of instructor.

NURS 585. Advanced Health Assessment. 3 Credits.
This course focuses on policies, programs and research related to rural health. Prerequisite: NURS 565 and NURS 558 or consent of instructor. F.

NURS 586. Rural Health Programs and Research. 3 Credits.
This course focuses on opportunities, programs and research related to rural health. Prerequisite: NURS 565 and NURS 558 or consent of instructor. F.

NURS 588. Management of Psychopathology I. 2 Credits.
This is the first of a two course sequence that focuses on the management of individuals across the lifespan, groups and families with or affected by psychopathology. Continuity of care across settings and community are emphasized. Prerequisites or Corequisites: NURS 564, NURS 584, and admission to the PMHNP program.

NURS 589. Management of Psychopathology II. 2 Credits.
This is the second of a two course sequence that focuses on the management of individuals across the lifespan, groups and families with or affected by psychopathology. Management of co-morbidities is emphasized. Prerequisite or Corequisite: NURS 588. S.

NURS 590. Directed Studies. 1-3 Credits.
Designed to meet the needs of individual and/or small groups of graduate students. The course content will be based on student interests and needs in conjunction with the faculty member's area of specialization. Prerequisite: Consent of instructor. Repeatable.

NURS 591. Readings in Nursing. 1-3 Credits.
Readings in selected nursing/health care topics with written and/or oral reports. Prerequisite: Consent of instructor. Repeatable.
NURS 592. Advanced PHN Practicum III. 4 Credits.
This course provides a capstone experience in Advanced PHN practice. Students are expected to integrate knowledge from all of their previous coursework into an applied practicum experience in population health, to evaluate population health interventions and programs, and develop strategies for program funding. Prerequisites: NURS 548 and NURS 549.

NURS 593. DNP Internship I. 4 Credits.
This first DNA Internship course is designed to provide the DNA Advanced Practice Nurse (APN) student with opportunities to apply the concepts in the AACN DNA Essentials document in the practice environment. Students will also begin development of the DNA capstone project. Corequisite: NURS 598.

NURS 594. DNP Internship II. 4 Credits.
This course is designed to provide the DNP student with additional practice focused learning opportunities to apply the concepts in the AACN DNP Essentials document in the practice environment. The student will complete and disseminate findings from the capstone project. Prerequisite: NURS 593. Corequisite: NURS 599.

NURS 595. DNP Internship III. 4 Credits.
This course is designed to provide the DNP APN with additional practice focused learning opportunities to apply the concepts in the AACN DNP Essentials document in the practice environment. The student will complete the DNP capstone project and disseminate findings in presentations and publications. Prerequisites: NURS 593 and NURS 594. Corequisite: NURS 596.

NURS 597. Advanced Clinical Practicum. 1-12 Credits.
This clinical practicum course provides the student with the opportunity to obtain extended clinical experience in the area of specialization. The course focuses on the integration of theoretical knowledge into clinical practice. A clinical/laboratory component is included. Prerequisite: Completion of NURS 517 for Nurse Anesthesia specialization or completion of first year curriculum for the Family Nurse Practitioner, Psychiatric/Mental Health or Gerontology specializations. Repeatable. S/U grading.

NURS 600. Integrated DNP Core Concepts I. 3 Credits.
This course is an exploration of the core concepts that support the varying roles of the DNP prepared APRN practice focused leader and clinical scholar. Development of practice focused leadership skills in the care of rural and vulnerable populations will also be addressed. Prerequisite: Admission to the DNP Program. F.

NURS 601. Integrated DNP Core Concepts II. 3 Credits.
This course builds upon content covered in Integrated DNP Core Concepts I. Students continue to explore core concepts that support the varying roles of the role of the DNP prepared APRN practice focused leader and clinical scholar. In addition, students will critically examine the historical evolution of epidemiology and epidemiological concepts relevant in advanced nursing practice. Prerequisites: Admission to the DNP Program and NURS 600. S.

NURS 602. Evidence Based Research I. 3 Credits.
This course focuses on the development of practice scholarship through the use of evidence to address clinical problems and inform future practice. Students in the class will define practice problems, evaluate evidence based methods to address those problems and design practice focused projects to measure outcomes. Middle range theories will also be explored and used as frameworks for study designs. Statistics and previous Evidence Based Practice course is highly recommended. Prerequisite or Corequisite: Admission to the DNP program. F.

NURS 603. Evidence-Based Research II. 3 Credits.
This course focuses on the continued development of the practice scholar and includes content of research and program evaluation methods and analysis used to address practice problems and inform future evidence based practice. Prerequisite: NURS 602. Corequisite: NURS 609. S.

NURS 604. Health Informatics. 3 Credits.
This course prepares the health care professional to use and evaluate emerging health care technology and data systems to support evidence-based practice. Prerequisite: Admission to DNP Program or consent of instructor. SS.

NURS 605. Health Policy. 2 Credits.
This course will prepare the health care professional to understand and apply knowledge of health policy to function as an advocate for populations and individuals. Prerequisite: Admission to the DNP Program or consent of instructor. SS.

NURS 606. DNP Systems Focused Practice I. 2 Credits.
This course is designed to provide the DNP student with opportunities to apply the concepts in the AACN DNP Essentials in the practice environment. Prerequisite: NURS 603. SS.

NURS 607. DNP Systems Focused Practice II. 3 Credits.
This course continues to provide the DNP student with opportunities to apply the concepts in the AACN DNP Essentials in the practice environment. Prerequisites: NURS 603 and NURS 606. F.

NURS 608. Healthcare Economics, Finance and Leadership. 3 Credits.
This course focuses on healthcare economics, finance and practice leadership skills related to the role of the DNP prepared advanced practice nurse within the complex health care system. Prerequisite or Corequisite: Admission to the DNP program or consent of instructor. F.

NURS 609. DNP Project Teams. 1-6 Credits.
The student will design, implement and evaluate the DNP project as well as present findings in the applicable practice setting under the guidance of DNP faculty. Prerequisite: NURS 603. Repeatable to 6 credits. F,S,SS.

NURS 610. DNP Capstone. 2 Credits.
The capstone course provides the DNP students with an opportunity to develop skills in reporting and disseminating practice focused research findings. Writing for publication of practice focused research is emphasized. Prerequisite or Corequisite: Admission to DNP program or consent of instructor. SS.

NURS 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

NURS 997. Independent Study. 2 Credits.

NURS 998. Thesis. 1-4 Credits.
Repeatable to 4 credits.

NURS 999. Dissertation. 1-15 Credits.
Repeatable to 15 credits.

**Nurse Anesthesia**

M.S. in Nurse Anesthesia (p. 491)

**Courses**

NURS 500. Theories/Concepts Nursing. 3 Credits.
The focus of this core course is on analysis of current nursing and related theories and concepts which guide clinical practice, curriculum development, research, and nursing administration.

NURS 502. Evidence for Practice. 3 Credits.
This course emphasizes the application of basic research concepts to the building of evidence-based practice in nursing. Advanced competencies are developed in searching and evaluating the literature, examining the merit of different types and levels of evidence, and analyzing the generalizability and implications for clinical practice. Prerequisites or Corequisites: Admission to one of the Graduate Nursing Tracks, NURS 500 and statistics and/or permission of instructor. F,S.

NURS 503. The Business of Practice. 2 Credits.
This course focuses on the business aspects of Inter-professional advanced practice in the complex health care environment. Prerequisite: Admission to the DNP Program.

NURS 504. Advanced Pharmacology I. 3 Credits.
Pharmacodynamic and pharmacokinetic principles with a focus on clinical anesthesia practice. Physiologic systems and drug classifications are used: emphasis on therapeutic use, side effects, drug interactions, and contraindications of drugs used for intravenous anesthesia induction, inhalation, and balanced anesthesia maintenance. Pediatric and geriatric variations will be addressed. Prerequisite: Admission to Nurse Anesthesia Specialization.
NURS 505. Advanced Pharmacology. 3 Credits.
The focus of this course is on the basic and advanced clinical concepts of pharmacology for the advanced practice nurse. Medication selection and administration will be addressed. Anatomy, physiology, and pathophysiology will be reviewed as appropriate to the physiologic system or medication class being discussed. Evidence-based guidelines with respect to the clinical application of medications utilized in selected acute and chronic health problems will be explored. Prerequisite or Corequisite: Admission to Graduate Nursing Program. F.

NURS 506. Advanced Pharmacology II. 3 Credits.
Advanced pharmacology for clinical nurse anesthesia practice. Prerequisite: NURS 504.

NURS 507. Anesthesia Seminar and Clinical Practicum. 4 Credits.
This course is designed to provide nurse anesthesia students an overview of the basic principles and skills needed to care for the routine surgical patient. Topics include difficult airway management, patient monitoring, patient preparation, positioning, patient safety, fluid and electrolyte management, documentation of anesthesia care, and an introduction to regional anesthesia. Analysis, integration, and utilization of research to improve practice is emphasized. The lecture content is reinforced through Clinical Simulation and laboratory experiences, allowing for immediate application of the lecture content and integration into the clinical setting. Students are introduced to the clinical setting through observational and hands-on experiences. Includes a clinical and/or laboratory component. Prerequisite: NURS 521.

NURS 508. Nurse Anesthesia Review Course. 1 Credit.
This course is faculty guided and designed to assist students with their review of nurse anesthesia course and clinical material in preparation for the CCNA certification examination. Prerequisite: Completion of all Nurse Anesthesia Specialization coursework.

NURS 509. Foundations for Nurse Education. 3 Credits.
This course begins to compare and contrast multiple roles and responsibilities of nurse educators in various settings in academic and health service. It will build the conceptual foundation for educational processes with emphasis on ethics, learning theories, taxonomies of learning and current evidence necessary for development of competencies necessary for the practice of educating. Students will begin to formulate their individual philosophy of teaching and learning. Prerequisite: Admission to the Nursing Graduate Program or consent of the instructor. Prerequisite or Corequisite: NURS 500. S.

NURS 510. Adv Physiology/Pathophysiology I. 3 Credits.
Normal physiologic functions associated with cellular structure and environment. Physiologic and pathophysiologic functions of the human body and its organ systems, both separately and integrated in whole activities. Prerequisite: Admissions to graduate study.

NURS 511. Adv Physiology/Pathophys II. 3 Credits.
Physiologic and pathophysiologic functions of the human body and its organ systems, both separately and integrated in whole activities. Prerequisite: NURS 510 or consent of instructor.

NURS 512. DNP Core Concepts I. 2 Credits.
This course is an exploration of the core concepts that support the developing role of the DNP as a practice focused leader and researcher. Prerequisite: Admission to the DNP Program.

NURS 513. DNP Core Concepts II. 2 Credits.
This course focuses on the concepts that support the development of the role of the DNP practice leader in the care of rural and vulnerable populations and issues related to planning and providing care for vulnerable and underserved populations. The primary content focus areas are epidemiology and vulnerability related to population and individual health. Prerequisites: Admission to the DNP Program and NURS 512. S.

NURS 514. Essentials in Epidemiology. 3 Credits.
This course will emphasize the application of the principles of epidemiology as applied to the investigation and prevention of individual and population health problems. Students will evaluate care delivery models and analyze epidemiological data to develop and apply strategies for health promotion and disease prevention for individuals, aggregates, and populations. The core competencies will focus not only on the practice of public health, but also enhance practice for the clinician. Prerequisite: Admission to the Graduate School, MPH Program, or permission of the the instructor. F.S.

NURS 515. Basic Principles of Anesthesia Practice I. 3 Credits.
This course provides an introduction to the fundamental principles necessary for the safe, professional, and individualized anesthetic care of diverse patients. Foundational concepts such as chemistry and physics as they apply to anesthesia practice, pharmacology of anesthetic agents, uncomplicated airway management, anesthesia delivery systems, and physiological monitoring will be investigated. Low and high fidelity patient simulation will be utilized to develop the student's cognitive and psychomotor skills which are essential to clinical anesthesia management. The course will conclude with a clinical component designed to acclimate beginning nurse anesthesia students to the clinical anesthesia arena. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. F.

NURS 516. Basic Principles of Anesthesia Practice II. 3 Credits.
This course builds upon the fundamentals covered in Basic Principles of Anesthesia I, all of which are necessary for the safe, professional, and individualized anesthetic care of diverse patients. Concepts such as basic perioperative anesthetic management, pain management, regional anesthesia, difficult airway management, effective oral and written communication, and patient and healthcare provider safety are emphasized. Low and high fidelity patient simulation will be utilized to develop the student's cognitive and psychomotor skills which are essential to clinical anesthesia management. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S.

NURS 517. Anesthesia Seminar and Clinical Practicum II. 5 Credits.
This course builds on the foundations learned in the prerequisite course. Advanced anesthesia principles are applied to various patient populations including the surgical patient with cardiovascular and respiratory diseases. Anesthesia care of other surgical populations including the trauma, orthopedic, urological, vascular, intra-abdominal and ENT patient will be explored. Important concepts include anatomical, physiological and pathophysiological, and pharmacological principles. Analysis, integration, and utilization of research to improve practice is emphasized. The lecture content is reinforced through simulated laboratory experiences, allowing for immediate application of the lecture content and integration into the clinical setting. A clinical rotation is included. Prerequisite: NURS 507.

NURS 518. Pharmacotherapeutics for Nurse Anesthesia. 2 Credits.
The focus of this course is on advanced clinical concepts of pharmacology relevant to the nurse anesthetist during the perioperative period. This course utilizes concepts from NURS 505 Advanced Pharmacology and further advances the student's knowledge in pharmacological concepts related to the practice of anesthesia. This course will examine the clinical application of anesthesia specific pharmacologic principles into formulating anesthetic plans for diverse patient populations. Prerequisite or Corequisite: NURS 505; Admission to the DNP Program - Nurse Anesthesia Track. S.

NURS 519. Practice Leadership. 2 Credits.
This course focuses on practice leadership theories and strategies related to the role of the DNP advanced practice nurse within the complex health care system. Prerequisite: Admission to DNP Program or consent of instructor.

NURS 520. Prof Role Dvlpmnt/Nurse Ansthsia. 3 Credits.
The focus of this course is on the identification and analysis of the professional components of nurse anesthesia practice, emphasizing role development; management and leadership; medical, ethical and legal responsibilities; the provision of culturally competent care; and scope of professional practice. Other areas that will be explored include quality improvement, the legislative process, credentialing, professional organizations, conflict resolution, and self-care and stress management for the anesthetist. An in-depth analysis of current trends and issues affecting healthcare and the delivery of anesthesia services are included in the course content. Prerequisites: NURS 521 and NURS 507. Corequisite: NURS 517.

NURS 521. Foundations of Anesthesia Practice. 3 Credits.
This course provides the foundation for nurse anesthesia practice. Lecture and discussion begin with an analysis of the history of anesthesia nursing, professionalism, and standards of care for the anesthetist. Safety in the nurse anesthesia environment will be emphasized. Additional content includes the applied chemical, physical, and biochemical concepts as they relate to anesthesia practice, including the mechanisms of anesthesia, medical management, medical gas systems, laws governing gases, the anesthesia machine, monitoring principles and equipment, airway equipment and basic airway management, and universal precautions. Prerequisite: Admission to the Nurse Anesthesia Specialization.
NURS 522. Advanced Pathophysiology. 3 Credits.
This course presents a system-focused approach to alterations in normal physiological mechanisms that result in pathologic disease processes. Physiological changes are compared and contrasted over the lifespan and developmental cellular physiology, pathogenesis and clinical manifestations commonly observed in altered health states are reviewed. This knowledge serves as the foundation for advanced clinical assessment, decision making and management for the advanced practice nurse. Prerequisite: Admission to graduate study. F,S,SS.

NURS 523. Health Promotion. 3 Credits.
Paradigms in health promotion, health detection, and disease prevention across the lifespan are used in synthesis in theory and evidence-based primary care interventions. Prerequisite: Admission to the Nursing Graduate Program or consent of the instructor. F,S.

NURS 524. Anatomy for Nurse Anesthetists. 1 Credit.
This course builds upon the concepts and fundamentals of Basic Principles of Anesthesia I and II as it relates to the detailed regional anatomy of the human body. A cadaver laboratory experience will be utilized throughout the course to develop the student's understanding of clinical anatomy related to the airway, central nervous system, peripheral nerves, cardiovascular system, and pulmonary system with an anesthesia context. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S.

NURS 525. Applied Multivariate Statistics. 3 Credits.
Principles, assumptions and applications of major multivariate statistical techniques commonly used in nursing and clinical health research. Prerequisite: Graduate level univariate statistics and admission to the Nursing Doctoral Program or consent of the instructor. F.

NURS 526. Ethical, Legal and Health Policy Issues. 3 Credits.
This course emphasizes health policy issues within the context of legal and ethical concepts. Students will examine and debate health policies in current practice, thus broadening their ability to analyze, implement, and evaluate health policy issues.

NURS 527. Anesthesia Seminar and Clinical Practicum III. 5 Credits.
This course further builds on the foundations learned in prerequisite courses. Students will incorporate previously learned anatomy, physiology, pathophysiology, and patient management into the care of subspecialty patients and patients with complex co-existing diseases. Advanced anesthesia principles are applied to the OB, pediatric, geriatric, and neuro patient. The pharmacology and anesthesia management of these subspecialty populations and patients with various disease states, such as kidney, musculoskeletal, and endocrine disorders, will be explored. Analysis, integration, and utilization of research to improve clinical practice is emphasized. The lecture content is reinforced with a clinical experience that emphasizes anesthesia care for subspecialty populations. A clinical/laboratory component is included. Prerequisite: NUR 517.

NURS 528. Advanced Principles of Anesthesia Practice I. 4 Credits.
This course builds upon the nurse anesthesia foundations covered previously in the Basic Principles of Anesthesia I and II courses. An evidence based approach to the anesthetic evaluation, planning, and management of diverse and increasingly complex patient populations, such as those with pre-existing respiratory, cardiac, and renal diseases, will be the focus. The hands-on administration of safe, individualized, and comprehensive anesthetic plans of care to both simulated and actual patients will be introduced and emphasized. Low and high fidelity patient simulation will be utilized to continue developing the student’s cognitive and psychomotor skills which are essential to perform clinical anesthesia management. A clinical component will allow the student to apply theoretical principles to nurse anesthesia practice and to increase their clinical skills,knowledge, and autonomy. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. SS.

NURS 529. Advanced Principles of Anesthesia Practice II. 6 Credits.
This course builds on the foundations covered in Basic Principles of Anesthesia I and II along with Advanced Principles I including the evaluation, planning, and management of diverse and increasingly complex patient populations. Evidence-based advanced principles of anesthesia care will be investigated in order to construct and implement comprehensive and individualized anesthetic plans of care for the management of subspecialty patients. Obstetrical and pediatric populations, as well as patients with complex co-existing diseases and/or those undergoing complex surgical procedures will be the focus. Low and high fidelity patient simulation will be utilized to continue developing the student’s cognitive and psychomotor skills which are essential to perform clinical anesthesia management. A clinical component will allow the student to apply theoretical principles to nurse anesthesia practice and to increase their clinical skills, knowledge, and autonomy. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. F.

NURS 530. Research Design & Methods in Nursing. 3 Credits.
Prerequisite or corequisite: NURS 500 or consent of instructor.

NURS 531. Adult-Gerontology Illness Management I. 3 Credits.
This is the first of a two-course sequence that focuses on evidenced-based primary care diagnosis and management of common episodic/chronic problems encountered by young adults, adults and older adults and their social network in ambulatory, inpatient, and community settings. Physiological, psychosocial, and pharmaceutical interventions are integrated into the holistic care that incorporates age-related, cultural, family, and community variations. An on-campus intensive is required for this course. Prerequisites: NURS 511 and NURS 585. Corequisite: NURS 597. F.

NURS 532. Family Centered Advanced Practice Nursing. 3 Credits.
Theoretical and scientific foundations for advanced practice nursing care for the family-as-a-unit in health and illness across the lifespan. Prerequisite: Admission to DNP program or consent of instructor. S.

NURS 533. Adult-Gerontology Illness Management II. 3 Credits.
This is the second of a two-course sequence that focuses on evidenced-based primary care diagnosis and management of common episodic/chronic problems encountered by young adults, adults and older adults and their social network in ambulatory, inpatient, and community settings. Physiological, psychosocial, and pharmacological interventions are integrated into the holistic care that incorporates age-related, cultural, family, and community variations. An on-campus intensive is required for this course. Prerequisite: NURS 531. Corequisite: NURS 597. S.

NURS 534. Management of Health Conditions in Primary Care I. 3 Credits.
This is the first of a two-course sequence that focuses on evidenced-based primary care diagnosis and management of common episodic/chronic problems encountered by adults, including young adults, middle aged adults and older adults and their social network in ambulatory, inpatient, and community settings. Physiological, psychosocial, and pharmacological interventions are integrated into the holistic care that incorporates age-related, cultural, family, and community variations. Prerequisites: NURS 522 and NURS 585. Corequisite: NURS 597 (II). F,S,SS.

NURS 535. Advanced Pharmacology for Primary Care I. 2 Credits.
Pharmacological agents utilized to treat common acute and chronic health problems are explored in depth. The course focus is on advanced nurse practice roles related to prescription, pharmacological, and therapeutic applications of the drugs. Prerequisite: Admission to the Nursing Graduate Program or consent of the instructor. Prerequisite or corequisite: NURS 510. F,S.

NURS 536. Advanced Nurse Educator Practice of Health Promotion. 2 Credits.
This practicum course affords the Nurse Educator student with opportunities to develop advanced skills in teaching-learning practices in the rural health care environments. The student will apply educational theories and best-evidence teaching strategies with a particular emphasis in education related to health promotion strategies. This course will include topics such as the Nurse Educator role to promote health in rural communities, assess health literacy, and develop appropriate patient educational materials. The practicum emphasizes health promotion education to meet diverse needs of rural dwelling patients, families and groups. Prerequisites: NURS 500, NURS 511, NURS 539, and NURS 514. Corequisite: NURS 526, and NURS 569. F.
NURS 537. Graduate Cooperative Education. 1-2 Credits.
The course focus is upon experience in advanced nursing practice integrating theory, research, and advanced practice in a specific area of nursing. Course overview: the purpose of this course is to provide the graduate nursing student with advanced nursing practice as an employee in a health care agency and to evaluate that experience in relation to the educational program. A clinical/laboratory component is included. Prerequisite: Permission of Graduate Director of Nursing. Repeatable to 9 credits.

NURS 538. Psych Diagnostic Reasoning. 2 Credits.
This course prepares students for advanced therapeutic communication, interviewing, and assessment of people with mental illness across the life span. Skills are developed in differential diagnoses of psychopathology within the scope and standards of advanced psychiatric mental health nursing practice. Clinical application is included. Prerequisite: Acceptance into the PMHNPs program or permission of instructor. S.

NURS 539. Advanced Pharmacology for Primary Care II. 2 Credits.
Pharmacological agents utilized to treat common acute and chronic health problems are explored in depth. The course focus is on advanced nurse practice roles related to prescription, pharmacological, and therapeutic applications of the drugs. Prerequisite: Admission to nursing graduate program and NURS 535 or consent of instructor. F.S.

NURS 540. Management of Health Conditions in Primary Care II. 3 Credits.
Clinical decision making skills are developed in the diagnosis and management of acute and chronic health conditions throughout the lifespan. Health promotion, health protection, and disease prevention are emphasized. Prerequisite: NURS 534. F.S,SS.

NURS 541. Illness Management - Adult Gerontology I. 3 Credits.
This is the first of a two-course sequence focusing on evidence-based primary care specific to the adult-gerontology population which includes adolescents, young adults and frail, older adults. This course prepares students to provide healthcare services across the adult-gerontology age spectrum from wellness to illness, using scientific knowledge and theoretical foundations to differentiate between normal and abnormal changes in physiological, psychological and sociological development and aging. Students will develop strategies to provide and coordinate interdisciplinary and holistic care that incorporates age-related, cultural, family, and community variations. Prerequisites: NURS 522, NURS 585, and NURS 597 (I). Corequisite: NURS 597 (II). F.S,SS.

NURS 542. Professional Aspects of Nurse Anesthesia Practice. 3 Credits.
This course provides the entry-level nurse anesthesia student with a foundational knowledge of professional aspects related to nurse anesthesia practice. The focus of this course is on historical perspectives, professional role development, anesthesia business practices, and professional wellness. Prerequisite: Admission to the DNP Program - Nurse Anesthesia Track. F.

NURS 543. Illness Management - Adult Gerontology II. 3 Credits.
This is the second of a two-course sequence that focuses on evidence based primary care specific to the adult-gerontology population which includes adolescents and young adults to frail, older adults. Course work focuses on evidence based acute and chronic care diagnosis and management of common episodic acute and chronic problems encountered by the adult-gerontology population. Physiological, psychosocial, and pharmacological assessments, including changes associated with aging and development across the adolescent- adult continuum are integrated into the formation of differential diagnosis and interventions of clinical problems in collaboration with other care providers. Prerequisites: NURS 541 and NURS 597 (II). Corequisite: NURS 597 (III). F.S,SS.

NURS 544. Pharmacotherapeutics for Primary Care. 2 Credits.
This course will help prepare the advance practice nursing student for prescriptive authority. Topics will focus on decision making regarding the pharmacological management of common acute and chronic illnesses encountered in primary care settings. Pharmacokinetics, pharmacodynamics, adverse drug reactions, and contraindications will be discussed. Ethical and legal principles of writing prescriptions will also be covered. Students will synthesize research findings related to various medications using case study and discussion. Prerequisites: Admission to DNP program (FNP, AGNP tracks), and NURS 505. S.

NURS 545. Care of the Frail Older Adult. 3 Credits.
In this course the advanced practice nursing student will focus on the complex and multifactorial health care needs of frail elders. Students will develop strategies to provide and coordinate interdisciplinary and holistic care of the frail elderly in a variety of settings. Prerequisite: Admission to DNP program or consent of instructor. S.

NURS 546. Advanced PHN I. 4 Credits.
NURS 546 introduces concepts foundational to advanced PHN practice and population health. Corequisite: NURS 547.

NURS 547. Advanced PHN Practicum I. 4 Credits.
The focus of this course is on application of foundational concepts of Advanced PHN practice. Students will conduct a community assessment and identify community problems and strengths. Written and oral communication skills are emphasized. Corequisite: NURS 546.

NURS 548. Advanced PHN II. 3 Credits.
This course focuses on the leadership role of advanced PHN practice. Public health and community-based organizational assessment, program monitoring and evaluation, quality improvement, and management of multiple projects are emphasized. Concepts of leadership in public and community health and collaborative interdisciplinary practice are discussed. Health policy and law and ethics as they relate to public health are explored. In addition, advanced PHN leadership in rural areas and in disaster/emergency preparedness and management are discussed. Prerequisites: NURS 502, NURS 546, and NURS 547. Corequisite: NURS 549.

NURS 549. Advanced PHN Practicum II. 3 Credits.
This course focuses on implementation of advanced PHN interventions. Corequisite: NURS 548.

NURS 550. Global Public Health Issues. 2 Credits.
This course focuses on population health issues at a global level. Differences in population health status between developing and developed countries are explored. Special emphasis is placed on war as a public health issue and the global impact of AIDS.

NURS 552. Role Development of the CNS. 2 Credits.
Students will compare and contrast the various roles of the clinical nurse specialist and evaluate those roles as they relate to their individual area of practice. Concepts of professional development are emphasized. Prerequisite: NURS 502.

NURS 553. Role Development of the NP. 2 Credits.
This course emphasizes professional role development of the nurse practitioner. Students will compare and contrast the various roles of the nurse practitioner and evaluate those roles as they relate to the student's individual planned area of practice. Prerequisite: NURS 502.

NURS 554. Writing for Publication. 2 Credits.
The course is designed to provide students with knowledge and skills necessary to meet the PhD program requirement and milestone of preparing and submitting a manuscript for publication in a peer-reviewed journal. The achievement of this milestone is foundational for scientific inquiry and the development of nurse scientists. Prerequisite: Consent of Instructor or Advisor. S/U grading. F.S,SS.

NURS 555. Grant Submission. 2 Credits.
The course results in the development and submission of a pre-doctoral, federally-funded research grant proposal, or equivalent with advisor approval. The course builds upon previous doctoral coursework covering grantsmanship and issues in preparing funded research proposals and grant budgets. Prerequisites: NURS 573 and consent of Instructor or Advisor. F.S,SS.

NURS 556. PhD Student Intensive. 1 Credit.
This course submerges the student into a community of scholars during an annual on-campus intensive experience. The student will participate in a variety of presentations, workshops, and activities which focus on development into the role of a nurse scientist and scholar. Prerequisite: Admission to the Nursing PhD program. Repeatable to 5 credits. S/U grading. F.S.

NURS 557. Foundations of Nursing Science. 3 Credits.
The epistemology and philosophy of nursing as an art and a science are examined. Patterns of knowing as well as clinical, conceptual, and empirical types of nursing knowledge will be discussed. The development of theory as a knowledge claim is analyzed. Prerequisites: Masters Level Nursing Theory Course and Admission to PhD Program. S.

NURS 558. Research Design. 3 Credits.
This course prepares the doctoral student to understand the link between research design and the study purpose. Prerequisite: Admission to PhD program or consent of instructor. F.
NURS 559. Maternal and Child Health in Primary Care. 2 Credits. This course focuses on advanced practice nursing care of obstetric and pediatric clients within a primary care setting. An on-campus intensive is required for this course. Prerequisites: Admission to FNP, NURS 510, NURS 511, NURS 523, and NURS 585. SS.

NURS 560. Clinical Anesthesia Practicum I. 5 Credits. This is the first of five clinical practicum courses that build upon one another and provides students the opportunity to obtain the clinical experiences necessary to develop increasing proficiency in nurse anesthesia practice. The emphasis of this course is the integration of current evidence and advanced nursing knowledge with decision making and case management for diverse, but less complex patient populations receiving anesthesia care. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S/U grading. S.

NURS 561. Clinical Anesthesia Practicum II. 3 Credits. This is the second of five clinical practicum courses designed to provide the student with the opportunity to obtain clinical experiences necessary to develop increasing proficiency in nurse anesthesia practice. The emphasis of this course is the integration of current evidence and advanced nursing knowledge with decision making and case management for the diverse and increasingly complex patient populations receiving anesthesia care. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S/U grading. SS.

NURS 562. Clinical Anesthesia Practicum III. 4 Credits. This is the third of five clinical practicum courses that provides the student with the opportunity to obtain clinical experiences necessary to develop increasing proficiency in nurse anesthesia practice. The emphasis of this course is the integration of current evidence and advanced nursing knowledge with decision making and case management for diverse patient populations, of all acuity levels, receiving anesthesia care. Emphasis will also be placed on student autonomy, continuing professional role development, and leadership skills. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S/U grading. F.

NURS 563. Clinical Anesthesia Practicum IV. 6 Credits. This is the fourth of five clinical practicum courses that provides the student with the opportunity to obtain clinical experiences necessary to develop increasing proficiency in nurse anesthesia practice. The emphasis of this course is the integration of current evidence and advanced nursing knowledge with decision making and case management for diverse patient populations, of all acuity levels, receiving anesthesia care. Emphasis will also be placed on student autonomy, continuing professional role development, and leadership skills. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S/U grading. S.

NURS 564. Psychopharmacology. 2 Credits. This course provides the advanced practice student with knowledge in the pharmacology of psychopathology across the life span. Emphasis will be placed on the appropriate use of pharmaceuticals for psychiatric disabilities/disorders including: mood disorders, development disorders, psychotic disorders, anxiety disorders, dementia, and substance abuse. Prerequisite: Admission to PMHNP program or permission of instructor. S.

NURS 565. Rural Populations and Rural Health. 3 Credits. This course provides an overview of characteristics of rural populations and rural health. Factors that contribute to health, morbidity, and mortality are examined, and the compounded vulnerability of rural and disadvantaged groups is analyzed. Prerequisite: A graduate level Epidemiology course or permission of instructor. S.

NURS 566. Curriculum Development. 3 Credits. This course focuses on the curriculum development process. Societal, professional, and institutional factors as well as current research findings influencing the curriculum development process are analyzed. Consideration of the impact of adult learning principles, workforce issues, legal-ethical concerns, and diverse student populations in regard to the curriculum development process is given. Prerequisite: NURS 509.

NURS 567. Teaching Methodologies. 3 Credits. This course explores theory-based teaching strategies designed to develop cognitive abilities, psychomotor skills, and affective qualities in learners from diverse backgrounds. Strategies and methods for the teaching of nursing content in a variety of settings are utilized. The use of technological tools in nursing education is evaluated. Prerequisite or corequisite: NURS 566.

NURS 568. Teaching Practicum. 2 Credits. Students assume the role of the nurse educator in selected learning settings under the guidance of a preceptor. A clinical/laboratory component is included. Prerequisites: NURS 566 and NURS 567 and NURS 569, or consent of instructor.

NURS 569. Assessment and Evaluation. 3 Credits. Principles of assessment, measurement, and evaluation are analyzed in this course as they relate to nursing education. The processes of assessing student learning, teaching, and program outcomes are explored. Topics relevant to the evaluation of individual student learning such as test development, evaluation of critical thinking, and clinical evaluation are included. The processes of faculty and program evaluation are examined. Prerequisites: NURS 566 and NURS 567, or consent of instructor.

NURS 572. Diverse Vulnerable Populations. 3 Credits. Students will explore a wide range of concepts as they apply to diverse and vulnerable populations. The focus of the course is on understanding concepts and principles important to nursing when doing research, planning health care, developing health policy, and teaching in this area. Prerequisite: Admission to the Nursing Graduate Program or consent of the instructor.

NURS 573. Research Funding. 3 Credits. This course integrates the scientific and practical aspects of professional writing and grant proposal development to obtain funds for research. Prerequisite: Admission to the graduate nursing program or approval of instructor. Prerequisite or Corequisite: NURS 574 and/or NURS 575; Non-nursing programs: Graduate level quantitative and/or qualitative research methods coursework required. F.

NURS 574. Quantitative Nursing Methods. 3 Credits. The purpose of this course is to acquire knowledge and skills necessary to apply quantitative research methods in nursing. The course includes substantial applications of established methodologies and effective research techniques within the quantitative paradigm. Prerequisite: Admission to the doctoral program and completion of a multivariate statistics course. S.

NURS 575. Qualitative Nursing Research. 3 Credits. This course focuses on examination and analysis of qualitative research designs with particular emphasis on approaches relevant to phenomena in nursing. Students will conduct fieldwork to develop some beginning qualitative research skills. Prerequisite or Corequisite: Admission to Doctoral Program or consent of instructor. F.

NURS 576. Clinical Anesthesia Practicum V. 5 Credits. This is the final capstone clinical practicum course that provides the student with the opportunity to develop full autonomy and proficiency in nurse anesthesia practice. The emphasis of this course is the integration of current evidence and advanced nursing knowledge with advanced clinical judgement, well developed clinical decision making, and total case management for diverse patient populations receiving anesthesia care. Professionalism and leadership within healthcare systems will be emphasized. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S/U grading. SS.

NURS 577. Rural Healthcare Ethics. 3 Credits. This course is directed toward the development of critical dialogue and leadership strategies for dealing with ethical issues related to nursing, health care and research. Commitment to discussion, understanding and acceptance of the rights of others in dilemmas is emphasized. Reflexive nursing, which brings attention to one's own position and objectivity, is encouraged. The challenges of ethics in rural milieus are included in the discourse. Prerequisite: Admission to the Nursing doctoral Program or consent of the instructor. S.

NURS 578. Doctoral Seminar. 1 Credit. Prerequisite: Admission to the Nursing doctoral Program or consent of the instructor.

NURS 580. Research Practicum. 1-6 Credits. The doctoral research practicum provides a research experience for doctoral nursing students separate from the dissertation to participate in the research process under the guidance of an experienced/funded investigator. Experiences may include grant writing, data collection, analysis, and manuscript writing. Repeatable to 6 credits. F,S,SS.

NURS 581. The Nurse Scientist. 3 Credits. This course prepares the doctoral student to actively engage in doctoral study with knowledge of the discipline of nursing and skills that facilitate success as an emerging nurse scientist. Prerequisite: Admission to PhD program. F.
NURS 583. Individual Therapy. 2 Credits.
This course provides knowledge and skill development in the implementation of evidence-based clinical therapies and treatments focused on the individual including cultural variations. Includes clinical practice. Prerequisites or corequisites: NURS 500, NURS 502, NURS 510, NURS 511, NURS 514, NURS 523, NURS 535, NURS 538, NURS 539, and NURS 585.

NURS 584. Group and Family Therapies. 3 Credits.
Evidence-based clinical interventions with diverse groups and families are presented. Opportunities for clinical implementation accompany the theoretical models. A clinical/behavioral component is included. Prerequisites or corequisites: NURS 538, NURS 583 and admission into Psychiatric Mental Health specialization or consent of instructor.

NURS 585. Advanced Health Assessment. 3 Credits.
An evidenced-based approach will be used to present methodologies for graduate student performance on health histories, development assessments, and psychological/psychosocial assessment methods of individuals. Communication and interviewing techniques for advanced practice are applied. A clinical/behavioral component is included with variations for Family Nurse Practitioner, Psych/Mental Health, Adult-Gerontology, and Nurse Anesthesia students. An on-campus intensive is required for this course. Prerequisite: Completion of an undergraduate course in health assessment techniques or consent of instructor. Prerequisite or corequisite: NURS 510. F.S.

NURS 586. Rural Health Programs and Research. 3 Credits.
This course focuses on policies, programs and research related to rural health. Prerequisite: NURS 565 and NURS 558 or consent of instructor. F.

NURS 588. Management of Psychopathology I 2 Credits.
This is the first of a two course sequence that focuses on the management of individuals across the lifespan, groups and families with or affected by psychopathology. Continuity of care across settings and community are emphasized. Prerequisites or Corequisites: NURS 564, NURS 584, and admission to the PMHN program.

NURS 589. Management of Psychopathology II. 2 Credits.
This is the second of a two course sequence that focuses on the management of individuals across the lifespan, groups and families with or affected by psychopathology. Management of co-morbidities is emphasized. Prerequisite or Corequisite: NURS 588. S.

NURS 590. Directed Studies. 1-3 Credits.
Designed to meet the needs of individual and/or small groups of graduate students. The course content will be based on student interests and needs in conjunction with the faculty member’s area of specialization. Prerequisite: Consent of instructor. Repeatable.

NURS 591. Readings in Nursing. 1-3 Credits.
Readings in selected nursing/health care topics with written and/or oral reports. Prerequisite: Consent of instructor. Repeatable.

NURS 592. Advanced PHN Practicum I. 4 Credits.
This course provides a capstone experience in Advanced PHN practice. Students are expected to integrate knowledge from all of their previous coursework into an applied practicum experience in population health, to evaluate population health interventions and programs, and develop strategies for program funding. Prerequisites: NURS 548 and NURS 549.

NURS 593. DNP Internship I. 4 Credits.
This first year DNP Internship course is designed to provide the DNP Advanced Practice Nurse (APN) student with opportunities to apply the concepts in the AACN DNP Essentials document in the practice environment. Students will also begin development of the APN capstone project. Corequisite: NURS 598.

NURS 594. DNP Internship II. 4 Credits.
This course is designed to provide the DNP student with additional practice focused learning opportunities to apply the concepts in the AACN DNP Essentials document in the practice environment. The student will complete and disseminate findings from the capstone project. Prerequisite: NURS 593. Corequisite: NURS 599.

NURS 595. DNP Internship III. 4 Credits.
This course is designed to provide the DNP APN with additional practice focused learning opportunities to apply the concepts in the AACN DNP Essentials document in the practice environment. The student will complete the DNP capstone project and disseminate findings in presentations and publications. Prerequisites: NURS 593 and NURS 594. Corequisite: NURS 596.

NURS 597. Advanced Clinical Practicum. 1-12 Credits.
This clinical practicum course provides the student with opportunities to obtain extended clinical experience in the area of specialization. The course focuses on the integration of theoretical knowledge into clinical practice. A clinical/behavioral component is included. Prerequisite: Completion of NURS 517 for Nurse Anesthesia specialization or completion of first year curriculum for the Family Nurse Practitioner, Psychiatric/Mental Health or Gerontology specializations. Repeatable. S/U grading.

NURS 600. Integrated DNP Core Concepts I. 3 Credits.
This course is an exploration of the core concepts that support the varying roles of the DNP prepared APRN as a practice focused leader and clinical scholar. Development of practice focused leadership skills in the care of rural and vulnerable populations will also be addressed. Prerequisite: Admission to the DNP Program. F.

NURS 601. Integrated DNP Core Concepts II. 3 Credits.
This course builds upon content covered in Integrated DNP Core Concepts I. Students continue to explore core concepts that support the varying roles of the role of the DNP prepared APRN practice focused leader and clinical scholar. In addition, students will critically examine the historical evolution of epidemiology and epidemiological concepts relevant in advanced nursing practice. Prerequisites: Admission to the DNP Program and NURS 600. S.

NURS 602. Evidence Based Research I. 3 Credits.
This course focuses on the development of practice scholarship through the use of evidence to address clinical problems and inform future practice. Students in the class will define practice problems, evaluate evidence based methods to address those problems and design practice focused projects to measure outcomes. Middle range theories will also be explored and used as frameworks for study designs. Statistics and previous Evidence Based Practice course is highly recommended. Prerequisite or Corequisite: Admission to the DNP program. F.

NURS 603. Evidence-Based Research II. 3 Credits.
This course focuses on the continued development of the practice scholar and includes content of research and program evaluation methods and analysis used to address practice problems and inform future evidence based practice. Prerequisite: NURS 602. Corequisite: NURS 609. S.

NURS 604. Health Informatics. 3 Credits.
This course prepares the health care practice professional to use and evaluate emerging health care technology and data systems to support evidence-based practice. Prerequisite: Admission to DNP Program or consent of instructor. SS.

NURS 605. Health Policy. 2 Credits.
This course will prepare the health care professional to understand and apply knowledge of health policy to function as an advocate for populations and individuals. Prerequisite: Admission to the DNP Program or consent of instructor. SS.

NURS 606. DNP Systems Focused Practice I. 2 Credits.
This course is designed to provide the DNP student with opportunities to apply the concepts in the AACN DNP Essentials in the practice environment. Prerequisite: NURS 603. SS.

NURS 607. DNP Systems Focused Practice II. 3 Credits.
This course continues to provide the DNP student with opportunities to apply the concepts in the AACN DNP Essentials in the practice environment. Prerequisites: NURS 603 and NURS 606. F.

NURS 608. Healthcare Economics, Finance and Leadership. 3 Credits.
This course focuses on healthcare economics, finance and practice leadership skills by focusing to the role of the DNP prepared advanced practice nurse within the complex health care system. Prerequisite or Corequisite: Admission to the DNP program or consent of instructor. F.

NURS 609. DNP Project Teams. 1-6 Credits.
The student will design, implement and evaluate the DNP project as well as present findings in the applicable practice setting under the guidance of DNP faculty. Prerequisite: NURS 603. Repeatable to 6 credits. F,S,SS.

NURS 610. DNP Capstone. 2 Credits.
The capstone course provides the DNP students with an opportunity to develop skills in reporting and disseminating practice focused research findings. Writing for publication of practice focused research is emphasized. Prerequisite or Corequisite: NURS 609. S,SS.

NURS 611. Rural Healthcare Forum. 1 Credit.
This course focuses on interprofessional healthcare delivery to rural and underserved populations. Prerequisite or Corequisite: Admission to DNP program or consent of instructor. SS.
NURS 996. Continuing Enrollment. 1-12 Credits.
NURS 997. Independent Study. 2 Credits.
NURS 998. Thesis. 1-4 Credits.
Repeattable to 4 credits.
NURS 999. Dissertation. 1-15 Credits.
Repeattable to 15 credits.

Master of Science in Nurse Anesthesia

The UND Nurse Anesthesia program has transitioned to a Doctor of Nursing Practice (DNP) degree program; therefore, the Master of Science in Nurse Anesthesia has been suspended and no new applications are being accepted at this time.

Admission Requirements

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog. Admission requirements for the Master of Science in Nursing include:

1. A bachelor’s degree in nursing from an NLNAC or CCNE accredited program. (Foreign schools will be evaluated on an individual basis.)
2. A minimum GPA of 3.00 is based on all years of study at the undergraduate level and includes a GPA of 3.00 in undergraduate science coursework.
3. An undergraduate or graduate course in statistics.
4. Current R.N. licensure (Photocopy must be attached to application.).
5. One year of experience as a registered nurse (preferred).
6. Additional requirements for Nurse Anesthesia are an upper division course in biochemistry (equivalent or higher), one year of critical care nursing experience (two years are preferred), and a successful interview.
7. Meet current health and immunization requirements of the College of Nursing and Professional Disciplines.
8. Submit to and satisfactorily complete a background check prior to admission.
9. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.
10. Applications must be received by September 1 of the calendar year.

Degree Requirements

Students seeking the Master of Science in Nursing degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the College of Nursing.

There is no residency requirement.

1. A minimum of 30 semester credits in a major field, including the credits granted for the thesis and the research leading to the thesis.
2. At least one-half of the credits must be at or above the 500-level.
3. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.
4. Completion of the for the M.S. thesis option or completion of the M.S. non-thesis option.
5. Clinical site visits by nursing professors are required by various certifying and accrediting bodies to appropriately supervise the learning experience of students. A clinical site visit course fee is required to offset the expenses to travel, arrange, and supervise clinical experiences across the state and beyond. Prospective students will be made aware of the Clinical Site Visit Course Fee structure through posting of the fees structure on the College of Nursing and Professional Disciplines website and in the College’s Graduate Handbook.
6. Required Courses:

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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tr>
<td>NURS 500</td>
<td>Theories/Concepts Nursing</td>
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<tr>
<td>NURS 502</td>
<td>Evidence for Practice</td>
<td>3</td>
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<td>NURS 504</td>
<td>Advanced Pharmacology I</td>
<td>3</td>
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<td>NURS 506</td>
<td>Advanced Pharmacology II</td>
<td>3</td>
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<td>NURS 507</td>
<td>Anesthesia Seminar and Clinical Practicum</td>
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<td>Nurse Anesthesia Review Course</td>
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<td>Adv Physiology/Pathophysiology I</td>
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<td>Adv Physiology/Pathophys II</td>
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<td>Prof Role Dvlpmt/Nurse Anesthesia</td>
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<td>NURS 521</td>
<td>Foundations of Anesthesia Practice</td>
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<td>NURS 527</td>
<td>Anesthesia Seminar and Clinical Practicum III</td>
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<td>NURS 585</td>
<td>Advanced Health Assessment</td>
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<td>NURS 597</td>
<td>Advanced Clinical Practicum</td>
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<td>ANAT 591</td>
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<td>BIMD 510</td>
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Students complete 29 credits of NURS 597 Advanced Clinical Practicum to comply with accreditation standards for supervised practice hours in anesthesia nursing. Total credits: 78-80.

Nurse Educator

M.S. in Nurse Educator (p. 491)

Master of Science in Nurse Educator

Admission Requirements

Approved admission to the Master of Science degree program requires the following of all students:

1. Completion of a baccalaureate degree or higher from an accredited nursing program
2. An undergraduate or graduate statistics course
3. A minimum GPA of at least 3.00 for the last two years of baccalaureate study (official transcripts must be submitted)
4. Current U.S. unencumbered RN licensure (upload Nursys verification report in application)
5. Three letters of recommendation
6. Current resume or curriculum vitae
7. Statement of goals
8. One year of experience as a registered nurse preferred – track specific experience desirable
9. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog
10. Interview may be required (via web, phone, or in person)
The focus of the course is on the basic and advanced clinical concepts of pharmacology for the advanced practice nurse. Medication selection and administration will be addressed. Anatomy, physiology, and pathophysiology will be reviewed as appropriate to the physiologic system or medication class being discussed. Evidence-based guidelines with respect to the clinical application of medications utilized in selected acute and chronic health problems will be explored. Prerequisite or Corequisite: Admission to Graduate Nursing Program. F.

NURS 506. Advanced Pharmacology II. 3 Credits.
Advanced pharmacology for clinical nurse anesthesia practice. Prerequisite: NURS 504.

NURS 507. Anesthesia Seminar and Clinical Practicum. 4 Credits.
This course is designed to provide nurse anesthesia students an overview of the basic principles and skills needed to care for the routine surgical patient. Topics include difficult airway management, patient monitoring, patient preparation, positioning, patient safety, fluid and electrolyte management, documentation of anesthesia care, and an introduction to regional anesthesia. Analysis, integration, and utilization of research to improve practice is emphasized. The lecture content is reinforced through Clinical Simulation and laboratory experiences, allowing for immediate application of the lecture content and integration into the clinical setting. Students are introduced to the clinical setting through observational and hands-on experiences. Includes a clinical and/or laboratory component. Prerequisite: NURS 521.

NURS 508. Nurse Anesthesia Review Course. 1 Credit.
This course is faculty guided and designed to assist students with their review of nurse anesthesia course and clinical material in preparation for the CCNA certification examination. Prerequisite: Completion of all Nurse Anesthesia Specialization coursework.

NURS 509. Foundations for Nurse Education. 3 Credits.
This course begins to compare and contrast multiple roles and responsibilities of nurse educators in various settings in academic and health service. It will build the conceptual foundation for educational processes with emphasis on ethics, learning theories, taxonomies of learning and current evidence necessary for development of competencies necessary for the practice of educating. Students will begin to formulate their individual philosophy of teaching and learning. Prerequisite: Admission to the Nursing Graduate Program or consent of the instructor. Prerequisite or Corequisite: NURS 500. S.

NURS 510. Adv Physiology/Pathophysiology I. 3 Credits.
Normal physiologic functions associated with cellular structure and function, and the human body and its own systems, both separately and integrated in whole activities. Prerequisite: Admissions to graduate study.

NURS 511. Adv Physiology/Pathophys II. 3 Credits.
Physiologic and pathophysiologic functions of the human body and its own systems, both separately and integrated in whole activities. Prerequisite: NURS 510 or consent of instructor.

NURS 512. DNP Core Concepts I. 2 Credits.
This course is an exploration of the core concepts that support the developing role of the DNP as a practice focused leader and researcher. Prerequisite: Admission to the DNP Program.

NURS 513. DNP Core Concepts II. 2 Credits.
This course focuses on the concepts that support the development of the role of the DNP practice leader in the care of rural and vulnerable populations and issues related to planning and providing care for vulnerable and underserved populations. The primary content focus areas are epidemiology and vulnerability related to population and individual health. Prerequisites: Admission to the DNP Program and NURS 512. S.
NURS 514. Essentials in Epidemiology. 3 Credits.
This course will emphasize the application of the principles of epidemiology as applied to the investigation and prevention of individual and population health problems. Students will evaluate care delivery models and analyze epidemiological data to develop and apply strategies for health promotion and disease prevention for individuals, aggregates, and populations. The core competencies will focus not only on the practice of public health, but also enhance practice for the clinician. Prerequisite: Admission to the Graduate School, MPH Program, or permission of the instructor. F,S.

NURS 515. Basic Principles of Anesthesia Practice I. 3 Credits.
This course provides an introduction to the fundamental principles necessary for the safe, professional, and individualized anesthetic care of diverse patients. Foundational concepts such as chemistry and physics as they apply to anesthesia practice, pharmacology of anesthetic agents, uncomplicated airway management, anesthesia delivery systems, and physiological monitoring will be investigated. Low and high fidelity patient simulation will be utilized to develop the student's cognitive and psychomotor skills which are essential to clinical anesthesia management. The course will conclude with a clinical component designed to acclimate beginning nurse anesthesia students to the clinical anesthesia arena. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. F.

NURS 516. Basic Principles of Anesthesia Practice II. 3 Credits.
This course builds upon the fundamentals covered in Basic Principles of Anesthesia I, all of which are necessary for the safe, professional, and individualized anesthetic care of diverse patients. Concepts such as basic perioperative anesthesia management, pain management, regional anesthesia, difficult airway management, effective oral and written communication, and patient and healthcare provider safety are emphasized. Low and high fidelity patient simulation will be utilized to develop the student's cognitive and psychomotor skills which are essential to clinical anesthesia management. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S.

NURS 517. Anesthesia Seminar and Clinical Practicum II. 5 Credits.
This course builds on the foundations learned in the prerequisite course. Advanced anesthesia principles are applied to various patient populations including the surgical patient with cardiovascular and respiratory diseases. Anesthesia care of other surgical populations including the trauma, orthopedic, urological, vascular, intra-abdominal and ENT patient will be explored. Important concepts include anatomical, physiological and pathophysiological, and pharmacological principles. Analysis, integration, and utilization of research to improve practice is emphasized. The lecture content is reinforced through simulated laboratory experiences, allowing for immediate application of the lecture content and integration into the clinical setting. A clinical rotation is included. Prerequisite: NURS 507.

NURS 518. Pharmacotherapeutics for Nurse Anesthesia. 2 Credits.
The focus of this course is on advanced clinical concepts of pharmacology relevant to the nurse anesthetist during the perioperative period. This course utilizes concepts from NURS 505 Advanced Pharmacology and further advances the student's knowledge in pharmacological concepts related to the practice of anesthesia. This course will examine the clinical application of anesthesia specific pharmacologic principles into formulating anesthetic plans for diverse patient populations. Prerequisite or Corequisite: NURS 505; Admission to the DNP Program - Nurse Anesthesia Track. S.

NURS 519. Practice Leadership. 2 Credits.
This course focuses on practice leadership theories and strategies related to the role of the DNP advanced practice nurse within the complex health care system. Prerequisite: Admission to DNP Program or consent of instructor.

NURS 520. Prof Role Dvlpmnt/Nurse Anesthesia. 3 Credits.
The focus of this course is on the identification and analysis of the professional components of nurse anesthesia practice, emphasizing role development; management and leadership; medical, ethical and legal responsibilities; the provision of culturally competent care; and scope of professional practice. Other areas that will be explored include quality improvement, the legislative process, credentialing, professional organizations, conflict resolution, and self-care and stress management for the anesthetist. An in-depth analysis of current trends and issues affecting healthcare and the delivery of anesthesia services are included in the course content. Prerequisites: NURS 521 and NURS 507. Corequisite: NURS 517.

NURS 521. Foundations of Anesthesia Practice. 3 Credits.
This course provides the foundation for nurse anesthesia practice. Lecture and discussion begin with an analysis of the history of anesthesia nursing, professionalism, and standards of care for the anesthetist. Safety in the nurse anesthesia environment will be emphasized. Additional content includes the applied chemical, physical, and biochemical concepts as they relate to anesthesia practice, including the mechanisms of anesthesia, medical mathematics, medical gas systems, laws governing gases, the anesthesia machine, monitoring principles and equipment, airway equipment and basic airway management, and universal precautions. Prerequisite: Admission to the Nurse Anesthesia Specialization.

NURS 522. Advanced Pathophysiology. 3 Credits.
This course presents a system-focused approach to alterations in normal physiological mechanisms that result in pathologic disease processes. Physiological changes are compared and contrasted over the lifespan and developmental cellular physiology, pathogenesis and clinical manifestations commonly observed in altered health states are reviewed. This knowledge serves as the foundation for advanced clinical assessment, decision making and management for the advanced practice nurse. Prerequisite: Admission to graduate study. F,S,SS.

NURS 523. Health Promotion. 3 Credits.
Paradigms in health promotion, health detection, and disease prevention across the lifespan are used in synthesis in theory and evidence-based primary care interventions. Prerequisite: Admission to the Nursing Graduate Program or consent of the instructor. F,S.

NURS 524. Anatomy for Nurse Anesthetists. 1 Credit.
This course builds upon the concepts and fundamentals of Basic Principles of Anesthesia I and II as it relates to the detailed regional anatomy of the human body. A cadaveric laboratory experience will be utilized throughout the course to develop the student's understanding of clinical anatomy related to the airway, central nervous system, peripheral nerves, cardiovascular system, and pulmonary system with an anesthesia context. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S.

NURS 525. Applied Multivariate Statistics. 3 Credits.
Principles, assumptions and applications of major multivariate statistical techniques commonly used in nursing and clinical health research. Prerequisite: Graduate level univariate statistics and admission to the Nursing Doctoral Program or consent of the instructor. F.

NURS 526. Ethical, Legal and Health Policy Issues. 3 Credits.
This course emphasizes health policy issues within the context of legal and ethical concepts. Students will examine and debate health policies in current practice, thus broadening their ability to analyze, implement, and evaluate health policy issues.

NURS 527. Anesthesia Seminar and Clinical Practicum III. 5 Credits.
This course further builds on the foundations learned in prerequisite courses. Students will incorporate previously learned anatomy, physiology, pathophysiology, and patient management into the care of subspecialty populations and patients with complex co-existing diseases. Advanced anesthesia principles are applied to the OB, pediatric, geriatric, and neuro patient. The pharmacology and anesthesia management of these subspecialty populations and patients with various disease states, such as kidney, musculoskeletal, and endocrine disorders, will be explored. Analysis, integration, and utilization of research to improve clinical practice is emphasized. The lecture content is reinforced with a clinical experience that emphasizes anesthesia care for subspecialty populations. A clinical/laboratory component is included. Prerequisite: NUR 517.

NURS 528. Advanced Principles of Anesthesia Practice I. 4 Credits.
This course builds upon the nurse anesthesia foundations covered previously in the Basic Principles of Anesthesia I and II courses. An evidence based approach to the anesthetic evaluation, planning, and management of diverse and increasingly complex patient populations, such as those with pre-existing respiratory, cardiac, and renal diseases, will be the focus. The hands-on administration of safe, individualized, and comprehensive anesthetic plans of care to both simulated and actual patients will be introduced and emphasized. Low and high fidelity patient simulation will be utilized to continue developing the student's cognitive and psychomotor skills which are essential to perform clinical anesthesia management. A clinical component will allow the student to apply theoretical principles to nurse anesthesia practice and to increase their clinical skills, knowledge, and autonomy. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. SS.
NURS 529. Advanced Principles of Anesthesia Practice II. 6 Credits.
This course builds on the foundations covered in Basic Principles of Anesthesia I and II along with Advanced Principles I including the evaluation, planning, and management of diverse and increasingly complex patient populations. Evidence-based advanced principles of anesthesia care will be investigated in order to construct and implement comprehensive and individualized anesthetic plans of care for the management of subspecialty patients. Obstetrical and pediatric populations, as well as patients with complex co-existing diseases and/or those undergoing complex surgical procedures will be the focus. Low and high fidelity patient simulation will be utilized to continue developing the student's cognitive and psychomotor skills which are essential to perform clinical anesthesia management. A clinical component will allow the student to apply theoretical principles to nurse anesthesia practice and to increase their clinical skills, knowledge, and autonomy. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. F.

NURS 530. Research Design & Methods in Nursing. 3 Credits.
Prerequisite or corequisite: NURS 500 or consent of instructor.

NURS 531. Adult-Gerontology Illness Management I. 3 Credits.
This is the first of a two-course sequence that focuses on evidenced-based primary care diagnosis and management of common episodic/chronic problems encountered by young adults, adults and older adults and their social network in ambulatory, inpatient, and community settings. Physiological, psychosocial, and pharmacological interventions are integrated into the holistic care that incorporates age-related, cultural, family, and community variations. An on-campus intensive is required for this course. Prerequisites: NURS 511 and NURS 585. Corequisite: NURS 597. F.

NURS 532. Family Centered Advanced Practice Nursing. 3 Credits.
Theoretical and scientific foundations for advanced practice nursing care for the family-as-a-unit in health and illness across the lifespan. Prerequisite: Admission to DNP program or consent of instructor. S.

NURS 533. Adult-Gerontology Illness Management II. 3 Credits.
This is the second of a two-course sequence that focuses on evidenced-based primary care diagnosis and management of common episodic/chronic problems encountered by young adults, adults and older adults and their social network in ambulatory, inpatient, and community settings. Physiological, psychosocial, and pharmacological interventions are integrated into the holistic care that incorporates age-related, cultural, family, and community variations. An on-campus intensive is required for this course. Prerequisite: NURS 531. Corequisite: NURS 597. S.

NURS 534. Management of Health Conditions in Primary Care I. 3 Credits.
This is the first of a two-course sequence that focuses on evidenced-based primary care diagnosis and management of common episodic/chronic problems encountered by adults, including young adults, middle aged adults and older adults and their social network in ambulatory, inpatient, and community settings. Physiological, psychosocial, and pharmacological interventions are integrated into the holistic care that incorporates age-related, cultural, family, and community variations. Prerequisites: NURS 522 and NURS 585. Corequisite: NURS 597 (II). F,S,SS.

NURS 535. Advanced Pharmacology for Primary Care I. 2 Credits.
Pharmacological agents utilized to treat common acute and chronic health problems are explored in depth. The course focus is on advanced nurse practice roles related to prescription, pharmacological, and therapeutic applications of the drugs. Prerequisite: Admission to the Nursing Graduate Program or consent of the instructor. Prerequisite or corequisite: NURS 510. F,S.

NURS 536. Advanced Nurse Educator Practice of Health Promotion. 2 Credits.
This practicum course affords the Nurse Educator student with opportunities to develop advanced skills in teaching-learning practices in the rural health care environments. The student will apply educational theories and best-evidence teaching strategies with a particular emphasis in education related to health promotion strategies. This course will include topics such as the Nurse Educator role to promote health in rural communities, assess health literacy, and develop appropriate patient educational materials. The practicum emphasizes health promotion education to meet diverse needs of rural dwelling patients, families and groups. Prerequisites: NURS 500, NURS 511, NURS 539, and NURS 514. Corequisite: NURS 526, and NURS 569. F.

NURS 537. Graduate Cooperative Education. 1-2 Credits.
The course focus is upon experience in advanced nursing practice integrating theory, research, and advanced practice in a specific area of nursing. Course overview: the purpose of this course is to provide the graduate nursing student with advanced nursing practice as an employee in a health care agency and to evaluate that experience in relation to the educational program. A clinical/laboratory component is included. Prerequisite: Permission of Graduate Director of Nursing. Repeatable to 9 credits.

NURS 583. Psych Diagnostic Reasoning. 2 Credits.
This course prepares students for advanced therapeutic communication, interpreting, and assessment of people with mental illness across the life span. Skills are developed in differential diagnoses of psychopathology within the scope and standards of advanced psychiatric mental health nursing practice. Clinical application is included. Prerequisite: Acceptance into the PMHNP program or permission of instructor. S.

NURS 539. Advanced Pharmacology for Primary Care II. 2 Credits.
Pharmacological agents utilized to treat common acute and chronic health problems are explored in depth. The course focus is on advanced nursing practice roles related to prescription, pharmacological, and therapeutic applications of the drugs. Prerequisite: Admission to nursing graduate program and NURS 535 or consent of instructor. F,S.

NURS 540. Management of Health Conditions in Primary Care II. 3 Credits.
Clinical decision making skills are developed in the diagnosis and management of acute and chronic health conditions throughout the lifespan. Health promotion, health protection, and disease prevention are emphasized. Prerequisite: NURS 534. F,S,SS.

NURS 541. Illness Management - Adult Gerontology I. 3 Credits.
This is the first of a two-course sequence focusing on evidence-based primary care specific to the adult-gerontology population which includes adolescents, young adults and frail, older adults. This course prepares students to provide healthcare services across the adult-gerontology age spectrum from wellness to illness, using scientific knowledge and theoretical foundations to differentiate between normal and abnormal changes in physiological, psychological and sociological development and aging. Students will develop strategies to provide and coordinate interdisciplinary and holistic care that incorporates age-related, cultural, family, and community variations. Prerequisites: NURS 522, NURS 585, and NURS 597 (I). Corequisite: NURS 597 (II). F,S,SS.

NURS 542. Professional Aspects of Nurse Anesthesia Practice. 3 Credits.
This course provides the entry-level nurse anesthesia student with a foundational knowledge of professional aspects related to nurse anesthesia practice. The focus of this course is on historical perspectives, professional role development, anesthesia business practices, and professional wellness. Prerequisite: Admission to the DNP Program - Nurse Anesthesia Track. F.

NURS 543. Illness Management - Adult Gerontology II. 3 Credits.
This is the second of a two-course sequence that focuses on evidence-based primary care specific to the adult-gerontology population which includes adolescents and young adults to frail, older adults. Course work focuses on evidence-based acute and chronic care diagnosis and management of common episodic acute and chronic problems encountered by the adult-gerontology population. Physiological, psychosocial, and pharmacological assessments, including changes associated with aging and development across the adolescent-adult continuum are integrated into the formation of differential diagnosis and interventions of clinical problems in collaboration with other care providers. Prerequisites: NURS 541 and NURS 597 (II). Corequisite: NURS 597 (III). F,S,SS.

NURS 544. Pharmacotherapeutics for Primary Care. 2 Credits.
This course will help prepare the advance practice nursing student for prescriptive authority. Topics will focus on decision making regarding the pharmacological management of common acute and chronic illnesses encountered in primary care settings. Pharmacokinetics, pharmacodynamics, adverse drug reactions, and contraindications will be discussed. Ethical and legal principles of writing prescriptions will also be covered. Students will synthesize research findings related to various medications using case study and discussion. Prerequisites: Admission to DNP program (FNP, AGNP tracks), and NURS 505. S.

NURS 545. Care of the Frail Older Adult. 3 Credits.
In this course the advanced practice nursing student will focus on the complex and multifactorial health care needs of frail elders. Students will develop strategies to provide and coordinate interdisciplinary and holistic care of the frail elderly in a variety of settings. Prerequisite: Admission to DNP program or consent of instructor. S.
NURS 546. Advanced PHN I. 4 Credits.
NURS 546 introduces concepts foundational to advanced PHN practice and population health. Corequisite: NURS 547.

NURS 547. Advanced PHN Practicum I. 4 Credits.
The focus of this course is on application of foundational concepts of Advanced PHN practice. Students will conduct a community assessment and identify community problems and strengths. Written and oral communication skills are emphasized. Corequisite: NURS 546.

NURS 548. Advanced PHN II. 3 Credits.
This course focuses on the leadership role of advanced PHN practice. Public health and community-based organizational assessment, program monitoring and evaluation, quality improvement, and management of multiple projects are emphasized. Concepts of leadership in public and community health and collaborative interdisciplinary practice are discussed. Health policy and law and ethics as they relate to public health are explored. In addition, advanced PHN leadership in rural areas and in disaster/emergency preparedness and management are discussed. Prerequisites: NURS 502, NURS 546, and NURS 547. Corequisite: NURS 549.

NURS 549. Advanced PHN Practicum II. 3 Credits.
This course focuses on implementation of advanced PHN interventions. Corequisite: NURS 548.

NURS 550. Global Public Health Issues. 2 Credits.
This course focuses on population health issues at a global level. Differences in population health status between developing and developed countries are explored. Special emphasis is placed on war as a public health issue and the global impact of AIDS.

NURS 552. Role Development of the CNS. 2 Credits.
Students will compare and contrast the various roles of the clinical nurse specialist and evaluate those roles as they relate to their individual area of practice. Concepts of professional development are emphasized. Prerequisite: NURS 502.

NURS 553. Role Development of the NP. 2 Credits.
This course emphasizes professional role development of the nurse practitioner. Students will compare and contrast the various roles of the nurse practitioner and evaluate those roles as they relate to the student's individual planned area of practice. Prerequisite: NURS 502.

NURS 554. Writing for Publication. 2 Credits.
The course is designed to provide students with knowledge and skills necessary to meet the PhD program requirement and milestone of preparing and submitting a manuscript for publication in a peer-reviewed journal. The achievement of this milestone is foundational for scientific inquiry and the development of nurse scientists. Prerequisite: Consent of Instructor or Advisor. S/U grading. F,S,SS.

NURS 555. Grant Submission. 2 Credits.
The course results in the development and submission of a pre-doctoral, federally-funded research grant proposal, or equivalent with advisor approval. The course builds upon previous doctoral coursework covering grantsmanship and issues in preparing funded research proposals and grant budgets. Prerequisites: NURS 573 and consent of Instructor or Advisor. F,S,SS.

NURS 556. PhD Student Intensive. 1 Credit.
This course submerges the student into a community of scholars during an annual on-campus intensive experience. The student will participate in a variety of presentations, workshops, and activities which focus on development into the role of a nurse scientist and scholar. The course uses a variety of activities which help the student develop into the role of a nurse scientist and scholar. Prerequisite: Admission to the Nursing PhD program. Repeatable to 5 credits. S/U grading. F,S.

NURS 557. Foundations of Nursing Science. 3 Credits.
The epistemology and philosophy of nursing as an art and a science are examined. Patterns of knowing as well as clinical, conceptual, and empirical types of nursing knowledge will be discussed. The development of theory as a knowledge claim is analyzed. Prerequisites: Masters Level Nursing Theory Course and Admission to PhD Program. S.

NURS 558. Research Design. 3 Credits.
This course prepares the doctoral student to understand the link between research design and the study purpose. Prerequisite: Admission to PhD program or consent of instructor. F.

NURS 559. Maternal and Child Health in Primary Care. 2 Credits.
This course focuses on advanced practice nursing care of obstetric and pediatric clients within a primary care setting. An on-campus intensive is required for this course. Prerequisites: Admission to FNP, NURS 510, NURS 511, NURS 523, and NURS 585. SS.

NURS 560. Clinical Anesthesia Practicum I. 5 Credits.
This is the first of five clinical practicum courses that build upon one another and provides students the opportunity to obtain the clinical experiences necessary to develop increasing proficiency in nurse anesthesia practice. The emphasis of this course is the integration of current evidence and advanced nursing knowledge with decision making and case management for diverse, but less complex, patient populations receiving anesthesia care. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S/U grading. S.

NURS 561. Clinical Anesthesia Practicum II. 3 Credits.
This is the second of five clinical practicum courses designed to provide the student with the opportunity to obtain clinical experiences necessary to develop increasing proficiency in nurse anesthesia practice. The emphasis of this course is the integration of current evidence and advanced nursing knowledge with decision making and case management for the diverse and increasingly more complex patient populations receiving anesthesia care. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S/U grading. SS.

NURS 562. Clinical Anesthesia Practicum III. 4 Credits.
This is the third of five clinical practicum courses that provides the student with the opportunity to obtain clinical experiences necessary to develop increasing proficiency in nurse anesthesia practice. The emphasis of this course is the integration of current evidence and advanced nursing knowledge with decision making and case management for the diverse, increasingly complex, patient populations receiving anesthesia care. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S/U grading. F.

NURS 563. Clinical Anesthesia Practicum IV. 6 Credits.
This is the fourth of five clinical practicum courses that provides the student with the opportunity to obtain clinical experiences necessary to develop increasing proficiency in nurse anesthesia practice. The emphasis of this course is the integration of current evidence and advanced nursing knowledge with decision making and case management for diverse patient populations, of all acuity levels, receiving anesthesia care. Emphasis will also be placed on student autonomy, continuing professional role development, and leadership skills. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S/U grading. S.

NURS 564. Psychopharmacology. 2 Credits.
This course provides the advanced practice student with knowledge in the pharmacology of psychopathology across the life span. Emphasis will be placed on the appropriate use of pharmaceuticals for psychiatric disorders including: Mood disorders, development disorders, psychotic disorders, anxiety disorders, dementia, and substance abuse. Prerequisite: Admission to PMHNP program or permission of instructor. S.

NURS 565. Rural Populations and Rural Health. 3 Credits.
This course provides an overview of characteristics of rural populations and rural health. Factors that contribute to health, morbidity, and mortality are examined, and the compounded vulnerability of rural and disadvantaged groups is analyzed. Prerequisite: A graduate level Epidemiology course or permission of instructor. S.

NURS 566. Curriculum Development. 3 Credits.
This course focuses on the curriculum development process. Societal, professional, and institutional factors as well as current research findings influencing the curriculum development process are analyzed. Consideration of the impact of adult learning principles, workforce issues, legal-ethical concerns, and diverse student populations in regard to the curriculum development process is given. Prerequisite: NURS 509.

NURS 567. Teaching Methodologies. 3 Credits.
The course explores theory-based teaching strategies designed to develop cognitive abilities, psychomotor skills, and affective qualities in learners from diverse backgrounds. Strategies and methods for the teaching of nursing content in a variety of settings are utilized. The use of technological tools in nursing education is evaluated. Prerequisite or corequisite: NURS 566.
NURS 568. Teaching Practicum. 2 Credits.
Students assume the role of the nurse educator in selected learning settings under the guidance of a preceptor. A clinical/laboratory component is included. Prerequisites: NURS 566 and NURS 567 and NURS 569, or consent of instructor.

NURS 569. Assessment and Evaluation. 3 Credits.
Principles of assessment, measurement, and evaluation are analyzed in this course as they relate to nursing education. The processes of assessing student learning, teaching, and program outcomes are explored. Topics relevant to the evaluation of individual student learning such as test development, evaluation of critical thinking, and clinical evaluation are included. The processes of faculty and program evaluation are examined. Prerequisites: NURS 566 and NURS 567, or consent of instructor.

NURS 572. Diverse Vulnerable Populations. 3 Credits.
Students will explore a wide range of concepts as they apply to diverse and vulnerable populations. The focus of the course is on understanding concepts and principles important to nursing when doing research, planning health care, developing health policy, and teaching in this area. Prerequisite: Admission to the Nursing Graduate Program or consent of the instructor.

NURS 573. Research Funding. 3 Credits.
This course integrates the scientific and practical aspects of professional writing and grant proposal development to obtain funds for research. Prerequisite: Admission to the graduate nursing program or approval of instructor. Prerequisite or Corequisite: NURS 574 and/or NURS 575; Non-nursing programs: Graduate level quantitative and/or qualitative research methods coursework required. F.

NURS 574. Quantitative Nursing Methods. 3 Credits.
The purpose of this course is to acquire knowledge and skills necessary to apply quantitative research methods in nursing. The course includes substantial applications of established methodologies and effective research techniques within the quantitative paradigm. Prerequisite: Admission to the doctoral program and completion of a multivariate statistics course. S.

NURS 575. Qualitative Nursing Research. 3 Credits.
This course focuses on examination and analysis of qualitative research designs with particular emphasis on approaches relevant to phenomena in nursing. Students will conduct fieldwork to develop some beginning qualitative research skills. Prerequisite or Corequisite: Admission to Doctoral Program or consent of instructor. F.

NURS 576. Clinical Anesthesia Practicum V. 5 Credits.
This is the final capstone clinical practicum course that provides the student with the opportunity to develop full autonomy and proficiency in nurse anesthesia practice. The emphasis of this course is the integration of current evidence and advanced nursing knowledge with advanced clinical judgement, well developed clinical decision making, and total case management for diverse patient populations receiving anesthesia care. Professionalism and leadership within healthcare systems will be emphasized. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S/U grading. SS.

NURS 577. Rural Healthcare Ethics. 3 Credits.
This course is directed toward the development of critical dialogue and leadership strategies for dealing with ethical issues related to nursing, health care and research. Commitment to discussion, understanding and acceptance of the rights of others in dilemmas is emphasized. Reflexive nursing, which brings attention to one's own position and objectivity, is encouraged. The challenges of ethics in rural milieus are included in the discourse. Prerequisite: Admission to the Nursing doctoral Program or consent of the instructor. S.

NURS 578. Doctoral Seminar. 1 Credit.
Prerequisite: Admission to the Nursing doctoral Program or consent of the instructor.

NURS 580. Research Practicum. 1-6 Credits.
The doctoral research practicum provides a research experience for doctoral nursing students separate from the dissertation to participate in the research process under the guidance of an experienced/funded investigator. Experiences may include grant writing, data collection, analysis, and manuscript writing. Repeatable to 6 credits. F,S,SS.

NURS 581. The Nurse Scientist. 3 Credits.
This course prepares the doctoral student to actively engage in doctoral study with knowledge of the discipline of nursing and skills that facilitate success as an emerging nurse scientist. Prerequisite: Admission to PhD program. F.

NURS 583. Individual Therapy. 2 Credits.
This course provides knowledge and skill development in the implementation of evidence-based clinical therapies and treatments focused on the individual including cultural variations. Includes clinical practice. Prerequisites or corequisites: NURS 500, NURS 502, NURS 510, NURS 511, NURS 514, NURS 523, NURS 535, NURS 538, NURS 539, and NURS 585.

NURS 584. Group and Family Therapies. 3 Credits.
Evidence-based clinical interventions with diverse groups and families are presented. Opportunities for clinical implementation accompany the theoretical models. A clinical/laboratory component is included. Prerequisites or corequisites: NURS 538, NURS 583 and admission into Psychiatric Mental Health specialization or consent of instructor.

NURS 585. Advanced Health Assessment. 3 Credits.
An evidenced-based approach will be used to present methodologies for graduate student performance on health histories, developmental assessments, and physical/psychosocial assessments of individuals. Communication and interviewing techniques for advanced nursing practice are applied. A clinical/laboratory component is included with variations for Family Nurse Practitioner, Psych/Mental Health, Adult-Gerontology, and Nurse Anesthesia students. An on-campus intensive is required for this course. Prerequisite: Completion of an undergraduate course in health assessment techniques or consent of instructor. Prerequisite or corequisite: NURS 510, F.S.

NURS 586. Rural Health Programs and Research. 3 Credits.
This course focuses on policies, programs and research related to rural health. Prerequisite: NURS 565 and NURS 558 or consent of instructor. F.

NURS 588. Management of Psychopathology I. 2 Credits.
This is the first of a two course sequence that focuses on the management of individuals across the lifespan, groups and families with or affected by psychopathology. Continuity of care across settings and community is emphasized. Prerequisites or Corequisites: NURS 564, NURS 584, and admission to the PMHNP program. Repeatable.

NURS 589. Management of Psychopathology II. 2 Credits.
This is the second of a two course sequence that focuses on the management of individuals across the lifespan, groups and families with or affected by psychopathology. Management of co-morbidities is emphasized. Prerequisite or Corequisite: NURS 588. S.

NURS 590. Directed Studies. 1-3 Credits.
Designed to meet the needs of individual and/or small groups of graduate students. The course content will be based on student interests and needs in conjunction with the faculty member's area of specialization. Prerequisite: Consent of instructor. Repeatable.

NURS 591. Readings in Nursing. 1-3 Credits.
Readings in selected nursing/health care topics with written and/or oral reports. Prerequisite: Consent of instructor. F.

NURS 592. Advanced PHN Practicum III. 4 Credits.
This course provides a capstone experience in Advanced PHN practice. Students are expected to integrate knowledge from all of their previous coursework into an applied practicum experience in population health, to evaluate population health interventions and programs, and develop strategies for program funding. Prerequisites: NURS 548 and NURS 549.

NURS 593. DNP Internship I. 4 Credits.
This first DNP Internship course is designed to provide the DNA Advanced Practice Nurse (APN) student with opportunities to apply the concepts in the AACN DNA Essentials document in the practice environment. Students will also begin development of the DNA capstone project. Corequisite: NURS 598.

NURS 594. DNP Internship II. 4 Credits.
This course is designed to provide the DNP student with additional practice focused learning opportunities to apply the concepts in the AACN DNP Essentials document in the practice environment. The student will complete and disseminate findings from the capstone project. Prerequisite: NURS 593. Corequisite: NURS 599.

NURS 595. DNP Internship III. 4 Credits.
This course is designed to provide the DNP APN with additional practice focused learning opportunities to apply the concepts in the AACN DNP Essentials document in the practice environment. The student will complete the DNP capstone project and disseminate findings in presentations and publications. Prerequisites: NURS 593 and NURS 594. Corequisite: NURS 596.
1. Completion of a baccalaureate degree or higher from an accredited nursing program
2. An undergraduate or graduate statistics course
3. A minimum GPA of at least 3.00 for the last two years of baccalaureate study (official transcripts must be submitted)
4. Current U.S. unencumbered RN licensure (upload Nursys verification report in application)
5. Three letters of recommendation
6. Current resume or curriculum vitae
7. Statement of goals
8. One year of experience as a registered nurse preferred – track specific experience desirable
9. Satisfy the School of Graduate Studies’ English Language proficiency requirements as published in the graduate catalog.
10. Interview may be required (via web, phone, or in person)
11. Successful passage of criminal background check and drug screen will be required upon offer of admission
12. Satisfaction of current health and immunization policy of the Department of Nursing will be required upon offer of admission

Degree Requirements

Students seeking the Master of Science degree with a major in Nursing degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the College of Nursing & Professional Disciplines.

1. A minimum of 30 semester credits in a major field.
2. At least one-half of the credits must be at or above the 500-level.
3. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.

Required Courses:

Psychiatric Mental Health Nursing Nurse Practitioner

- NURS 500 Theories/Concepts Nursing
- NURS 502 Evidence for Practice
- NURS 505 Advanced Pharmacology
- NURS 522 Advanced Pathophysiology
- NURS 523 Health Promotion
- NURS 538 Psych Diagnostic Reasoning
- NURS 553 Role Development of the NP
- NURS 564 Psychopharmacology
- NURS 583 Individual Therapy
- NURS 584 Group and Family Therapies
- NURS 585 Advanced Health Assessment
- NURS 588 Management of Psychopathology I

Master of Science in Psychiatric Mental Health Nurse Practitioner

Admission Requirements

Approved admission to the Master of Science degree program requires the following of all students:

Required Courses:

Psychiatric Mental Health Nurse Practitioner

- NURS 500 Theories/Concepts Nursing
- NURS 502 Evidence for Practice
- NURS 505 Advanced Pharmacology
- NURS 522 Advanced Pathophysiology
- NURS 523 Health Promotion
- NURS 538 Psych Diagnostic Reasoning
- NURS 553 Role Development of the NP
- NURS 564 Psychopharmacology
- NURS 583 Individual Therapy
- NURS 584 Group and Family Therapies
- NURS 585 Advanced Health Assessment
- NURS 588 Management of Psychopathology I
Family Nurse Practitioner

M.S. in Family Nurse Practitioner (p. 503)

Post Master's Certificate in Family Nurse Practitioner (http://und-public.coursesleaf.com/graduateacademicinformation/departmentalcoursesprograms/nursing/familynursepractitioner/cert)

Courses

NURS 500. Theories/Concepts Nursing. 3 Credits.
The focus of this core course is on analysis of current nursing and related theories and concepts which guide clinical practice, curriculum development, research, and nursing administration.

NURS 502. Evidence for Practice. 3 Credits.
This course emphasizes the application of basic research concepts to the building of evidence-based practice in nursing. Advanced competencies are developed in searching and evaluating the literature, examining the merit of different types and levels of evidence, and analyzing the generalizability and implications for clinical practice. Prerequisites or Corequisites: Admission to one of the Graduate Nursing Tracks, NURS 500 and statistics and/or permission of instructor. F,S.

NURS 503. The Business of Practice. 2 Credits.
This course focuses on the business aspects of inter-professional advanced practice in the complex health care environment. Prerequisite: Admission to the DNP Program.

NURS 504. Advanced Pharmacology I. 3 Credits.
Pharmacodynamic and pharmacokinetic principles with a focus on clinical anesthesia practice. Physiologic systems and drug classifications are used; emphasis on therapeutic use, side effects, drug interactions, and contraindications of drugs used for intravenous anesthesia induction, inhalation, and balanced anesthesia maintenance. Pediatric and geriatric variations will be addressed. Prerequisite: Admission to Nurse Anesthesia Specialization.

NURS 505. Advanced Pharmacology. 3 Credits.
The focus of this course is on the basic and advanced clinical concepts of pharmacology for the advanced practice nurse. Medication selection and administration will be addressed. Anatomy, physiology, and pathophysiology will be reviewed as appropriate to the physiologic system or medication class being discussed. Evidence-based guidelines with respect to the clinical application of medications utilized in selected acute and chronic health problems will be explored. Prerequisite or Corequisite: Admission to Graduate Nursing Program. F.

NURS 506. Advanced Pharmacology II. 3 Credits.
Advanced pharmacology for clinical nurse anesthesia practice. Prerequisite: NURS 504.

NURS 507. Anesthesia Seminar and Clinical Practicum. 4 Credits.
This course is designed to provide nurse anesthesia students an overview of the basic principles and skills needed to care for the routine surgical patient. Topics include difficult airway management, patient monitoring, patient preparation, positioning, patient safety, fluid and electrolyte management, documentation of anesthesia care, and an introduction to regional anesthesia. Analysis, integration, and utilization of research to improve practice is emphasized. The lecture content is reinforced through Clinical Simulation and laboratory experiences, allowing for immediate application of the lecture content and integration into the clinical setting. Students are introduced to the clinical setting through observational and hands-on experiences. Includes a clinical and/or laboratory component. Prerequisite: NURS 521.

NURS 508. Nurse Anesthesia Review Course. 1 Credit.
This course is faculty guided and designed to assist students with their review of nurse anesthesia course and clinical material in preparation for the CCNA certification examination. Prerequisite: Completion of all Nurse Anesthesia Specialization coursework.

NURS 509. Foundations for Nurse Education. 3 Credits.
This course begins to compare and contrast multiple roles and responsibilities of nurse educators in various settings in academic and health service. It will build the conceptual foundation for educational processes with emphasis on ethics, learning theories, taxonomies of learning and current evidence necessary for development of competencies necessary for the practice of educating. Students will begin to formulate their individual philosophy of teaching and learning. Prerequisite: Admission to the Nursing Graduate Program or consent of the instructor. Prerequisite or Corequisite: NURS 500. S.

NURS 510. Adv Physiology/Pathophysiology I. 3 Credits.
Normal physiologic functions associated with cellular structure and environment. Physiologic and pathophysiologic functions of the human body and its organ systems, both separately and integrated in whole activities. Prerequisite: Admissions to graduate study.

NURS 511. Adv Physiology/Pathophys II. 3 Credits.
Physiologic and pathophysiologic functions of the human body and its organ systems, both separately and integrated in whole activities. Prerequisite: NURS 510 or consent of instructor.

NURS 512. DNP Core Concepts I. 2 Credits.
This course is an exploration of the core concepts that support the developing role of the DNP as a practice focused leader and researcher. Prerequisite: Admission to the DNP Program.

NURS 513. DNP Core Concepts II. 2 Credits.
This course focuses on the concepts that support the development of the role of the DNP practice leader in the care of rural and vulnerable populations and issues related to planning and providing care for vulnerable and underserved populations. The primary content focus areas are epidemiology and vulnerability related to population and individual health. Prerequisites: Admission to the DNP Program and NURS 512. S.

NURS 514. Essentials in Epidemiology. 3 Credits.
This course will emphasize the application of the principles of epidemiology as applied to the investigation and prevention of individual and population health problems. Students will evaluate care delivery models and analyze epidemiological data to develop and apply strategies for health promotion and disease prevention for individuals, aggregates, and populations. The core competencies will focus not only on the practice of public health, but also enhance practice for the clinician. Prerequisite: Admission to the Graduate School, MPH Program, or permission of the instructor. F,S.

NURS 515. Basic Principles of Anesthesia Practice I. 3 Credits.
This course provides an introduction to the fundamental principles necessary for the safe, professional, and individualized anesthetic care of diverse patients. Foundational concepts such as chemistry and physics as they apply to anesthesia practice, pharmacology of anesthetic agents, uncomplicated airway management, anesthesia delivery systems, and physiological monitoring will be investigated. Low and high fidelity patient simulation will be utilized to develop the student’s cognitive and psychomotor skills which are essential to clinical anesthesia management. The course will conclude with a clinical component designed to acclimate beginning nurse anesthesia students to the clinical anesthesia arena. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. F.

NURS 516. Basic Principles of Anesthesia Practice II. 3 Credits.
This course builds upon the fundamentals covered in Basic Principles of Anesthesia I, all of which are necessary for the safe, professional, and individualized anesthetic care of diverse patients. Concepts such as basic perioperative anesthetic management, pain management, regional anesthesia, difficult airway management, effective oral and written communication, and patient and healthcare provider safety are emphasized. Low and high fidelity patient simulation will be utilized to develop the student’s cognitive and psychomotor skills which are essential to clinical anesthesia management. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S.
NURS 517. Anesthesia Seminar and Clinical Practicum II. 5 Credits.
This course builds on the foundations learned in the prerequisite course. Advanced anesthesia principles are applied to various patient populations including the surgical patient with cardiovascular and respiratory diseases. Anesthesia care of other surgical populations including the trauma, orthopedic, urological, vascular, intra-abdominal and ENT patient will be explored. Important concepts include anatomical, physiological and pathophysiological, and pharmacological principles. Analysis, integration, and utilization of research to improve practice is emphasized. The lecture content is reinforced through simulated laboratory experiences, allowing for immediate application of the lecture content and integration into the clinical setting. A clinical rotation is included. Prerequisite: NURS 507.

NURS 518. Pharmacotherapeutics for Nurse Anesthesia. 2 Credits.
The focus of this course is on advanced clinical concepts of pharmacology relevant to the nurse anesthetist during the perioperative period. This course utilizes concepts from NURS 505 Advanced Pharmacology and further advances the student's knowledge in pharmacological concepts related to the practice of anesthesia. This course will examine the clinical application of anesthesia specific pharmacologic principles into formulating anesthetic plans for diverse patient populations. Prerequisite or Corequisite: NURS 505; Admission to the DNP Program - Nurse Anesthesia Track. S.

NURS 519. Practice Leadership. 2 Credits.
This course focuses on practice leadership theories and strategies related to the role of the DNP advanced practice nurse within the complex health care system. Prerequisite: Admission to DNP Program or consent of instructor.

NURS 520. Prof Role Dvlpmnt/Nurse Anesthesia. 3 Credits.
The focus of this course is on the identification and analysis of the professional components of nurse anesthesia practice, emphasizing role development; management and leadership; medical, ethical and legal responsibilities; the provision of culturally competent care; and scope of professional practice. Other areas that will be explored include quality improvement, the legislative process, credentialing, professional organizations, conflict resolution, and self-care and stress management for the anesthetist. An in-depth analysis of current trends and issues affecting healthcare and the delivery of anesthesia services are included in the course content. Prerequisites: NURS 521 and NURS 507. Corequisite: NURS 517.

NURS 521. Foundations of Anesthesia Practice. 3 Credits.
This course provides the foundation for nurse anesthesia practice. Lecture and discussion begin with an analysis of the history of anesthesia nursing, professionalism, and standards of care for the anesthetist. Safety in the nurse anesthesia environment will be emphasized. Additional content includes the applied chemical, physical, and biochemical concepts as they relate to anesthesia practice, including the mechanisms of anesthesia, medical mathematics, medical gas systems, laws governing gases, the anesthesia machine, monitoring principles and equipment, airway equipment and basic airway management, and universal precautions. Prerequisite: Admission to the Nurse Anesthesia Specialization.

NURS 522. Advanced Pathophysiology, 3 Credits.
This course presents a system-focused approach to alterations in normal physiological mechanisms that result in pathologic disease processes. Physiological changes are compared and contrasted over the lifespan and developmental cellular physiology, pathogenesis and clinical manifestations commonly observed in altered health states are reviewed. This knowledge serves as the foundation for advanced clinical assessment, decision making and management for the advanced practice nurse. Prerequisite: Admission to graduate study. F,S,SS.

NURS 523. Health Promotion. 3 Credits.
Paradigms in health promotion, health detection, and disease prevention across the lifespan are used in synthesis in theory and evidence-based primary care interventions. Prerequisite: Admission to the Nursing Graduate Program or consent of the instructor. F,S.

NURS 524. Anatomy for Nurse Anesthetists. 1 Credit.
This course builds upon the concepts and fundamentals of Basic Principles of Anesthesia I and II as it relates to the detailed regional anatomy related to the airway, central nervous system, peripheral nerves, cardiovascular system, and pulmonary system with an anesthesia context. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S.

NURS 525. Applied Multivariate Statistics. 3 Credits.
Principles, assumptions and applications of major multivariate statistical techniques commonly used in nursing and clinical health research. Prerequisite: Graduate level univariate statistics and admission to the Nursing Doctoral Program or consent of the instructor. F.

NURS 526. Ethical, Legal and Health Policy Issues. 3 Credits.
This course emphasizes health policy issues within the context of legal and ethical concepts. Students will examine and debate health policies in current practice, thus broadening their ability to analyze, implement, and evaluate health policy issues.

NURS 527. Anesthesia Seminar and Clinical Practicum III. 5 Credits.
This course further builds on the foundations learned in prerequisite courses. Students will incorporate previously learned anatomy, physiology, pathophysiology, and patient management into the care of subspecialty patients and patients with complex co-existing diseases. Advanced anesthesia principles are applied to the OB, pediatric, geriatric, and neuro patient. The pharmacology and anesthesia management of these subspecialty populations and patients with various disease states, such as kidney, musculoskeletal, and endocrine disorders, will be explored. Analysis, integration, and utilization of research to improve clinical practice is emphasized. The lecture content is reinforced with a clinical experience that emphasizes anesthesia care for subspecialty populations. A clinical/laboratory component is included. Prerequisite: NURS 517.

NURS 528. Advanced Principles of Anesthesia Practice I. 4 Credits.
This course builds upon the nurse anesthesia foundations covered previously in the Basic Principles of Anesthesia I and II courses. An evidence based approach to the anesthetic evaluation, planning, and management of diverse and increasingly complex patient populations, such as those with pre-existing respiratory, cardiac, and renal diseases, will be the focus. The hands-on administration of safe, individualized, and comprehensive anesthetic plans of care to both simulated and actual patients will be introduced and emphasized. Low and high fidelity patient simulation will be utilized to continue developing the student's cognitive and psychomotor skills which are essential to perform clinical anesthesia management. A clinical component will allow the student to apply theoretical principles to nurse anesthesia practice and to increase their clinical skills, knowledge, and autonomy. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. SS.

NURS 529. Advanced Principles of Anesthesia Practice II. 6 Credits.
This course builds on the foundations covered in Basic Principles of Anesthesia I and II along with Advanced Principles I including the evaluation, planning, and management of diverse and increasingly complex patient populations. Evidence-based advanced principles of anesthesia care will be investigated in order to construct comprehensive and individualized anesthetic plans of care for the management of subspecialty patients. Obstetrical and pediatric populations, as well as patients with complex co-existing diseases and/or those undergoing complex surgical procedures will be the focus. Low and high fidelity patient simulation will be utilized to continue developing the student's cognitive and psychomotor skills which are essential to perform clinical anesthesia management. A clinical component will allow the student to apply theoretical principles to nurse anesthesia practice and to increase their clinical skills, knowledge, and autonomy. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. F.

NURS 530. Research Design & Methods in Nursing. 3 Credits.
Prerequisite or corequisite: NURS 500 or consent of instructor.

NURS 531. Adult-Gerontology Illness Management I 3 Credits.
This is the first of a two-course sequence that focuses on evidenced-based primary care diagnosis and management of common episodic/chronic problems encountered by young adults, adults and older adults and their social network in ambulatory, inpatient, and community settings. Physiological, psychosocial, and pharmacological interventions are integrated into the holistic care that incorporates age-related, cultural, family, and community variations. An on-campus intensive is required for this course. Prerequisites: NURS 511 and NURS 585. Corequisite: NURS 597. F.

NURS 532. Family Centered Advanced Practice Nursing. 3 Credits.
Theoretical and scientific foundations for advanced practice nursing care for the family-as-a-unit in health and illness across the lifespan. Prerequisite: Admission to DNP program or consent of instructor. S.
NURS 533. Adult-Gerontology Illness Management II. 3 Credits.
This is the second of a two-course sequence that focuses on evidenced-based primary care diagnosis and management of common episodic/chronic problems encountered by young adults, adults and older adults and their social network in ambulatory, inpatient, and community settings. Physiological, psychosocial, and pharmacological interventions are integrated into the holistic care that incorporates age-related, cultural, family, and community variations. An on-campus intensive is required for this course. Prerequisite: NURS 531. Corequisite: NURS 597. S.

NURS 534. Management of Health Conditions in Primary Care I. 3 Credits.
This is the first of a two-course sequence that focuses on evidenced-based primary care diagnosis and management of common episodic/chronic problems encountered by adults, including young adults, middle aged adults and older adults and their social network in ambulatory, inpatient, and community settings. Physiological, psychosocial, and pharmacological interventions are integrated into the holistic care that incorporates age-related, cultural, family, and community variations. Prerequisites: NURS 522 and NURS 585. Corequisite: NURS 597 (II). F.S.SS.

NURS 535. Advanced Pharmacology for Primary Care I. 2 Credits.
Pharmacological agents utilized to treat common acute and chronic health problems are explored in depth. The course focus is on advanced nurse practice roles related to prescription, pharmacological, and therapeutic applications of the drugs. Prerequisite: Admission to the Nursing Graduate Program or consent of the instructor. Prerequisite or corequisite: NURS 510. F.S.

NURS 536. Advanced Nurse Educator Practice of Health Promotion. 2 Credits.
This practicum course affords the Nurse Educator student with opportunities to develop advanced skills in teaching-learning practices in the rural health care environments. The student will apply educational theories and best-evidence teaching strategies with a particular emphasis in education related to health promotion strategies. This course will include topics such as the Nurse Educator role to promote health in rural communities, assess health literacy, and develop appropriate patient educational materials. The practicum emphasizes health promotion education to meet diverse needs of rural dwelling patients, families and groups. Prerequisites: NURS 500, NURS 511, NURS 539, and NURS 514. Corequisite: NURS 526, and NURS 569. F.

NURS 537. Graduate Cooperative Education. 1-2 Credits.
The course focus is upon experience in advanced nursing practice integrating theory, research, and advanced practice in a specific area of nursing. Course overview: the purpose of this course is to provide the graduate nursing student with advanced nursing practice as an employee in a health care agency and to evaluate that experience in relation to the educational program. A clinical/ laboratory component is included. Prerequisite: Permission of Graduate Director of Nursing. Repeatable to 9 credits.

NURS 538. Psych Diagnostic Reasoning. 2 Credits.
This course prepares students for advanced therapeutic communication, interviewing, and assessment of people with mental illness across the life span. Skills are developed in differential diagnoses of psychopathology within the scope and standards of advanced psychiatric mental health nursing practice. Clinical application is included. Prerequisite: Acceptance into the PMHNP program or permission of instructor. S.

NURS 539. Advanced Pharmacology for Primary Care II. 2 Credits.
Pharmacological agents utilized to treat common acute and chronic health problems are explored in depth. The course focus is on advanced nurse practice roles related to prescription, pharmacological, and therapeutic applications of the drugs. Prerequisite: Admission to nursing graduate program and NURS 535 or consent of instructor. F.S.

NURS 540. Management of Health Conditions in Primary Care II. 3 Credits.
Clinical decision making skills are developed in the diagnosis and management of acute and chronic health conditions throughout the lifespan. Health promotion, health protection, and disease prevention are emphasized. Prerequisite: NURS 534. F.S.SS.

NURS 541. Illness Management - Adult Gerontology I. 3 Credits.
This is the first of a two-course sequence focusing on evidence-based primary care specific to the adult-gerontology population which includes adolescents, young adults and frail, older adults. This course prepares students to provide healthcare services across the adult-gerontology age spectrum from wellness to illness, using scientific knowledge and theoretical foundations to differentiate between normal and abnormal changes in physiological, psychological and sociological development and aging. Students will develop strategies to provide and coordinate interdisciplinary and holistic care that incorporates age-related, cultural, family, and community variations. Prerequisites: NURS 522, NURS 585, and NURS 597 (I). Corequisite: NURS 597 (II). F.S.SS.

NURS 542. Professional Aspects of Nurse Anesthesia Practice. 3 Credits.
This course provides the entry-level nurse anesthesia student with a foundational knowledge of professional aspects related to nurse anesthesia practice. The focus of this course is on historical perspectives, professional role development, anesthesia business practices, and professional wellness. Prerequisite: Admission to the DNP Program - Nurse Anesthesia Track. F.

NURS 543. Illness Management - Adult Gerontology II. 3 Credits.
This is the second of a two-course sequence that focuses on evidence based primary care specific to the adult-gerontology populations which includes adolescents and young adults to frail, older adults. Course work focuses on evidence based acute and chronic care diagnosis and management of common episodic acute and chronic problems encountered by the adult - gerontological population. Physiological, psychosocial, and pharmacological assessments, including changes associated with aging and development across the adolescent - adult continuum are integrated into the formation of differential diagnosis and interventions of clinical problems in collaboration with other care providers. Prerequisites: NURS 541 and NURS 597 (II). Corequisite: NURS 597 (III). F.S.SS.

NURS 544. Pharmacotherapeutics for Primary Care. 2 Credits.
This course will help prepare the advance practice nursing student for prescriptive authority. Topics will focus on decision making regarding the pharmacological management of common acute and chronic illnesses encountered in primary care settings. Pharmacokinetics, pharmacodynamics, adverse drug reactions, and contraindications will be discussed. Ethical and legal principles of writing prescriptions will also be covered. Students will synthesize research findings related to various medications using case study and discussion. Prerequisites: Admission to DNP program (FNP, AGNP tracks), and NURS 505. S.

NURS 545. Care of the Frail Older Adult. 3 Credits.
In this course the advanced practice nursing student will focus on the complex and multifactorial health care needs of frail elders. Students will develop strategies to provide and coordinate interdisciplinary and holistic care of the frail elderly in a variety of settings. Prerequisite: Admission to DNP program or consent of instructor. S.

NURS 546. Advanced PHN I. 4 Credits.
NURS 546 introduces concepts foundational to advanced PHN practice and population health. Corequisite: NURS 547.

NURS 547. Advanced PHN Practicum I. 4 Credits.
The focus of this course is on application of foundational concepts of Advanced PHN practice. Students will conduct community assessment and identify community problems and strengths. Written and oral communication skills are emphasized. Corequisite: NURS 546.

NURS 548. Advanced PHN II. 3 Credits.
This course focuses on the leadership role of advanced PHN practice. Public health, community-based organizing, assessment, program management and evaluation, quality improvement, and management of multiple projects are emphasized. Concepts of leadership in public and community health and collaborative interdisciplinary practice are discussed. Health policy and law and ethics as they relate to public health are explored. In addition, advanced PHN leadership in rural areas and in disaster/emergency preparedness and management are discussed. Prerequisites: NURS 502, NURS 546, and NURS 547. Corequisite: NURS 548.

NURS 549. Advanced PHN Practicum II. 3 Credits.
This course focuses on implementation of advanced PHN interventions. Corequisite: NURS 548.

NURS 550. Global Public Health Issues. 2 Credits.
This course focuses on population health issues at a global level. Differences in population health status between developing and developed countries are explored. Special emphasis is placed on war as a public health issue and the global impact of AIDS.
NURS 552. Role Development of the CNS. 2 Credits.
Students will compare and contrast the various roles of the clinical nurse specialist and evaluate those roles as they relate to their individual area of practice. Concepts of professional development are emphasized. Prerequisite: NURS 502.

NURS 553. Role Development of the NP. 2 Credits.
This course emphasizes professional role development of the nurse practitioner. Students will compare and contrast the various roles of the nurse practitioner and evaluate those roles as they relate to the student’s individual planned area of practice. Prerequisite: NURS 502.

NURS 554. Writing for Publication. 2 Credits.
The course is designed to provide students with knowledge and skills necessary to meet the PhD program requirement and milestone of preparing and submitting a manuscript for publication in a peer-reviewed journal. The achievement of this milestone is foundational for scientific inquiry and the development of nurse scientists. Prerequisite: Consent of Instructor or Advisor. S/U grading. F,S,SS.

NURS 555. Grant Submission. 2 Credits.
The course results in the development and submission of a pre-doctoral, federally-funded research grant proposal, or equivalent with advisor approval.
The course builds upon previous doctoral coursework covering grantsmanship and issues in preparing funded research proposals and grant budgets.
Prerequisites: NURS 573 and consent of Instructor or Advisor. F.S,SS.

NURS 556. PhD Student Intensive. 1 Credit.
This course submerges the student into a community of scholars during an annual on-campus intensive experience. The student will participate in a variety of presentations, workshops, and activities which focus on development into the role of a nurse scientist and scholar. The course uses a variety of activities which help the student develop into the role of a nurse scientist and scholar.
Prerequisite: Admission to the Nursing PhD program. Repeatable to 5 credits. S/U grading. F.S.

NURS 557. Foundations of Nursing Science. 3 Credits.
The epistemology and philosophy of nursing as an art and a science are examined. Patterns of knowing as well as clinical, conceptual, and empirical types of nursing knowledge will be discussed. The development of theory as a knowledge claim is analyzed. Prerequisites: Masters Level Nursing Theory Course and Admission to PhD Program. S.

NURS 558. Research Design. 3 Credits.
This course prepares the doctoral student to understand the link between research design and the study purpose. Prerequisite: Admission to PhD program or consent of instructor. F.

NURS 559. Maternal and Child Health in Primary Care. 2 Credits.
This course focuses on advanced practice nursing care of obstetric and pediatric clients within a primary care setting. An on-campus intensive is required for this course.
Prerequisites: Admission to FNP, NURS 510, NURS 511, NURS 523, and NURS 585. SS.

NURS 560. Clinical Anesthesia Practicum I. 5 Credits.
This is the first of five clinical practicum courses that build upon one another and provides students the opportunity to obtain the clinical experiences necessary to develop increasing proficiency in nurse anesthesia practice. The emphasis of this course is the integration of current evidence and advanced nursing knowledge with decision making and case management for the diverse and increasingly complex patient populations receiving anesthesia care. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S/U grading. S.

NURS 561. Clinical Anesthesia Practicum II. 3 Credits.
This is the second of five clinical practicum courses designed to provide the student with the opportunity to obtain clinical experiences necessary to develop increasing proficiency in nurse anesthesia practice. The emphasis of this course is the integration of current evidence and advanced nursing knowledge with decision making and case management for the diverse and increasingly complex patient populations receiving anesthesia care. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S/U grading. SS.

NURS 562. Clinical Anesthesia Practicum III. 4 Credits.
This is the third of five clinical practicum courses that provides the student with the opportunity to obtain clinical experiences necessary to develop increasing proficiency in nurse anesthesia practice. The emphasis of this course is the integration of current evidence and advanced nursing knowledge with decision making and case management for the diverse, increasingly complex, patient populations receiving anesthesia care. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S/U grading. F.

NURS 563. Clinical Anesthesia Practicum IV. 6 Credits.
This is the fourth of five clinical practicum courses that provides the student with the opportunity to obtain clinical experiences necessary to develop increasing proficiency in nurse anesthesia practice. The emphasis of this course is the integration of current evidence and advanced nursing knowledge with decision making and case management for diverse patient populations, of all acuity levels, receiving anesthesia care. Emphasis will also be placed on student autonomy, continuing professional role development, and leadership skills. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S/U grading. S.

NURS 564. Psychopharmacology. 2 Credits.
This course provides the advanced practice student with knowledge in the pharmacology of psychopathology across the life span. Emphasis will be placed on the appropriate use of pharmaceuticals for psychiatric disabilities/disorders including: Mood disorders, development disorders, psychotic disorders, anxiety disorders, dementia, and substance abuse. Prerequisite: Admission to PMHNP program or permission of instructor. S.

NURS 565. Rural Populations and Rural Health. 3 Credits.
This course provides an overview of characteristics of rural populations and rural health. Factors that contribute to health, morbidity, and mortality are examined, and the compounded vulnerability of rurality and disadvantaged groups is analyzed. Prerequisite: A graduate level Epidemiology course or permission of instructor. S.

NURS 566. Curriculum Development. 3 Credits.
This course focuses on the curriculum development process. Societal, professional, and institutional factors as well as current research findings influencing the curriculum development process are analyzed. Consideration of the impact of adult learning principles, workforce issues, legal-ethical concerns, and diverse student populations in regard to the curriculum development process is given. Prerequisite: NURS 509.

NURS 567. Teaching Methodologies. 3 Credits.
The course explores theory-based teaching strategies designed to develop cognitive abilities, psychomotor skills, and affective qualities in learners from diverse backgrounds. Strategies and methods for the teaching of nursing content in a variety of settings are utilized. The use of technological tools in nursing education is evaluated. Prerequisite or corequisite: NURS 566.

NURS 568. Teaching Practicum. 2 Credits.
Students assume the role of the nurse educator in selected learning settings under the guidance of a preceptor. A clinical/laboratory component is included.
Prerequisites: NURS 566 and NURS 567 and NURS 569, or consent of instructor.

NURS 569. Assessment and Evaluation. 3 Credits.
Principles of assessment, measurement, and evaluation are analyzed in this course as they relate to nursing education. The processes of assessing student learning, teaching, and program outcomes are explored. Topics relevant to the evaluation of individual student learning such as test development, evaluation of critical thinking, and clinical evaluation are included. The processes of faculty and program evaluation are examined.
Prerequisites: NURS 566 and NURS 567, or consent of instructor.

NURS 570. Assessment and Evaluation. 3 Credits.
Students will explore a wide range of concepts as they apply to diverse and vulnerable populations. The focus of the course is on understanding concepts and principles important to nursing when doing research, planning health care, developing health policy, and teaching in this area.
Prerequisite: Admission to the Nursing Graduate Program or consent of the instructor.

NURS 573. Research Funding. 3 Credits.
This course integrates the scientific and practical aspects of professional writing and grant proposal development to obtain funds for research. Prerequisite: Admission to the graduate nursing program or approval of instructor.
Prerequisite or Corequisite: NURS 574 and/or NURS 575. Non-nursing programs: Graduate level quantitative and/or qualitative research methods coursework required. F.
NURS 574. Quantitative Nursing Methods. 3 Credits.
The purpose of this course is to acquire knowledge and skills necessary to apply quantitative research methods in nursing. The course includes substantial applications of established methodologies and effective research techniques within the quantitative paradigm. Prerequisite: Admission to the doctoral program and completion of a multivariate statistics course. S.

NURS 575. Qualitative Nursing Research. 3 Credits.
This course focuses on examination and analysis of qualitative research designs with particular emphasis on approaches relevant to phenomena in nursing. Students will conduct fieldwork to develop some beginning qualitative research skills. Prerequisite or Corequisite: Admission to Doctoral Program or consent of instructor. F.

NURS 576. Clinical Anesthesia Practicum V. 5 Credits.
This is the final capstone clinical practicum course that provides the student with the opportunity to develop full autonomy and proficiency in nurse anesthesia practice. The emphasis of this course is the integration of current evidence and advanced nursing knowledge with advanced clinical judgement, well developed clinical decision making, and total case management for diverse patient populations receiving anesthesia care. Professionalism and leadership within healthcare systems will be emphasized. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S/U grading. SS.

NURS 577. Rural Healthcare Ethics. 3 Credits.
This course is directed toward the development of critical dialogue and leadership strategies for dealing with ethical issues related to nursing, health care and research. Commitment to discussion, understanding and acceptance of the rights of others in dilemmas is emphasized. Reflexive nursing, which brings attention to one's own position and objectivity, is encouraged. The challenges of ethics in rural milieus are included in the discourse. Prerequisite: Admission to the Nursing doctoral Program or consent of the instructor. S.

NURS 578. Doctoral Seminar. 1 Credit.
Prerequisite: Admission to the Nursing doctoral Program or consent of the instructor.

NURS 580. Research Practicum. 1-6 Credits.
The doctoral research practicum provides a research experience for doctoral nursing students separate from the dissertation to participate in the research process under the guidance of an experienced/funded investigator. Experiences may include grant writing, data collection, analysis, and manuscript writing. Repeatable to 6 credits. F,S,SS.

NURS 581. The Nurse Scientist. 3 Credits.
This course prepares the doctoral student to actively engage in doctoral study with knowledge of the discipline of nursing and skills that facilitate success as an emerging nurse scientist. Prerequisite: Admission to PhD program. F.

NURS 583. Individual Therapy. 2 Credits.
This course provides knowledge and skill development in the implementation of evidence-based clinical therapies and treatments focused on the individual including cultural variations. Includes clinical practice. Prerequisites or corequisites: NURS 500, NURS 502, NURS 510, NURS 511, NURS 514, NURS 523, NURS 535, NURS 538, NURS 539, and NURS 585.

NURS 584. Group and Family Therapies. 3 Credits.
Evidence-based clinical interventions with diverse groups and families are presented. Opportunities for clinical implementation accompany the theoretical models. A clinical/laboratory component is included. Prerequisites or corequisites: NURS 538, NURS 583 and admission into Psychiatric Mental Health specialization or consent of instructor.

NURS 585. Advanced Health Assessment. 3 Credits.
An evidenced-based approach will be used to present methodologies for graduate student performance on health histories, developmental assessments, and physical/psychosocial assessments of individuals. Communication and interviewing techniques for advanced nursing practice are applied. A clinical/laboratory component is included with variations for Family Nurse Practitioner, Psych/Mental Health, Adult-Gerontology, and Nurse Anesthesia students. An on-campus intensive is required for this course. Prerequisite: Completion of an undergraduate course in health assessment techniques or consent of instructor. Prerequisite or corequisite: NURS 510. F,S.

NURS 586. Rural Health Programs and Research. 3 Credits.
This course focuses on policies, programs and research related to rural health. Prerequisite: NURS 565 and NURS 558 or consent of instructor. F.

NURS 588. Management of Psychopathology I. 2 Credits.
This is the first of a two course sequence that focuses on the management of individuals across the lifespan, groups and families with or affected by psychopathology. Continuity of care across settings and community are emphasized. Prerequisites or Corequisites: NURS 564, NURS 584, and admission to the PMHNP program.

NURS 589. Management of Psychopathology II. 2 Credits.
This is the second of a two course sequence that focuses on the management of individuals across the lifespan, groups and families with or affected by psychopathology. Management of co-morbidities is emphasized. Prerequisite or Corequisite: NURS 588. S.

NURS 590. Directed Studies. 1-3 Credits.
Designed to meet the needs of individual and/or small groups of graduate students. The course content will be based on student interests and needs in conjunction with the faculty member's area of specialization. Prerequisite: Consent of instructor. Repeatable.

NURS 591. Readings in Nursing. 1-3 Credits.
Readings in selected nursing/health care topics with written and/or oral reports. Prerequisite: Consent of instructor. Repeatable.

NURS 592. Advanced PHN Practicum III. 4 Credits.
This course provides a capstone experience in Advanced PHN practice. Students are expected to integrate knowledge from all of their previous coursework into an applied practicum experience in population health, to evaluate population health interventions and programs, and develop strategies for program funding. Prerequisites: NURS 548 and NURS 549.

NURS 593. DNP Internship I. 4 Credits.
This first DNA Internship course is designed to provide the DNA Advanced Practice Nurse (APN) student with opportunities to apply the concepts in the AACN DNA Essentials document in the practice environment. Students will also begin development of the DNA capstone project. Corequisite: NURS 598.

NURS 594. DNP Internship II. 4 Credits.
This course is designed to provide the DNP student with additional practice focused learning opportunities to apply the concepts in the AACN DNA Essentials document in the practice environment. The student will complete and disseminate findings from the capstone project. Prerequisite: NURS 593. Corequisite: NURS 599.

NURS 595. DNP Internship III. 4 Credits.
This course is designed to provide the DNP APN with additional practice focused learning opportunities to apply the concepts in the AACN DNA Essentials document in the practice environment. The student will complete the DNP capstone project and disseminate findings in presentations and publications. Prerequisites: NURS 593 and NURS 594. Corequisite: NURS 596.

NURS 597. Advanced Clinical Practicum. 1-12 Credits.
This clinical practicum course provides the student with the opportunity to obtain extended clinical experience in the area of specialization. The course focuses on the integration of theoretical knowledge into clinical practice. A clinical/laboratory component is included. Prerequisite: Completion of NURS 517 for Nurse Anesthesia specialization or completion of first year curriculum for the Family Nurse Practitioner, Psychiatric/Mental Health or Gerontology specializations. Repeatable. S/U grading.

NURS 600. Integrated DNP Core Concepts I. 3 Credits.
This course is an exploration of the core concepts that support the varying roles of the DNP prepared APRN as a practice focused leader and clinical scholar. Development of practice focused leadership skills in the care of rural and vulnerable populations will also be addressed. Prerequisite: Admission to the DNP Program. F.

NURS 601. Integrated DNP Core Concepts II. 3 Credits.
This course builds upon content covered in Integrated DNP Core Concepts I. Students continue to explore core concepts that support the varying roles of the role of the DNP prepared APRN practice focused leader and clinical scholar. In addition, students will critically examine the historical evolution of epidemiology and epidemiological concepts relevant in advanced nursing practice. Prerequisites: Admission to the DNP Program and NURS 600. S.
NURS 602. Evidence Based Research I. 3 Credits.
This course focuses on the development of practice scholarship through the use of evidence to address clinical problems and inform future practice. Students in the class will define practice problems, evaluate evidence based methods to address those problems and design practice focused projects to measure outcomes. Middle range theories will also be explored and used as frameworks for study designs. Statistics and previous Evidence Based Practice course is highly recommended. Prerequisite or Corequisite: Admission to the DNP program. F.

NURS 603. Evidence-Based Research II. 3 Credits.
This course focuses on the continued development of the practice scholar and includes content of research and program evaluation methods and analysis used to address practice problems and inform future evidence based practice. Prerequisite: NURS 602. Corequisite: NURS 609. S.

NURS 604. Health Informatics. 3 Credits.
This course prepares the health care practice professional to use and evaluate emerging health care technology and data systems to support evidence-based practice. Prerequisite: Admission to DNP Program or consent of instructor. SS.

NURS 605. Health Policy. 2 Credits.
This course will prepare the health care professional to understand and apply knowledge of health policy to function as an advocate for populations and individuals. Prerequisite: Admission to the DNP Program or consent of instructor. SS.

NURS 606. DNP Systems Focused Practice I. 2 Credits.
This course is designed to provide the DNP student with opportunities to apply the concepts in the AACN DNP Essentials in the practice environment. Prerequisite: NURS 603. SS.

NURS 607. DNP Systems Focused Practice II. 3 Credits.
This course continues to provide the DNP student with opportunities to apply the concepts in the AACN DNP Essentials in the practice environment. Prerequisites: NURS 603 and NURS 606. F.

NURS 608. Healthcare Economics, Finance and Leadership. 3 Credits.
This course focuses on healthcare economics, finance and practice leadership skills related to the role of the DNP prepared advanced practice nurse within the complex health care system. Prerequisite or Corequisite: Admission to the DNP program or consent of instructor. F.

NURS 609. DNP Project Teams. 1-6 Credits.
The student will design, implement and evaluate the DNP project as well as present findings in the applicable practice setting under the guidance of DNP faculty. Prerequisite: NURS 603. Repeatable to 6 credits. F,S,SS.

NURS 610. DNP Capstone. 2 Credits.
The capstone course provides the DNP students with an opportunity to develop skills in reporting and disseminating practice focused research findings. Writing for publication of practice focused research is emphasized. Prerequisite or Corequisite: NURS 609. S,SS.

NURS 611. Rural Healthcare Forum. 1 Credit.
This course focuses on interprofessional healthcare delivery to rural and underserved populations. Prerequisite or Corequisite: Admission to DNP program or consent of instructor. SS.

NURS 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

NURS 997. Independent Study. 2 Credits.

NURS 998. Thesis. 1-4 Credits.
Repeatable to 4 credits.

NURS 999. Dissertation. 1-15 Credits.
Repeatable to 15 credits.

Master of Science in Family Nurse Practitioner

Admission Requirements
Approved admission to the Master of Science degree program requires the following of all students:

1. Completion of a baccalaureate degree or higher from an accredited nursing program
2. An undergraduate or graduate statistics course
3. A minimum GPA of at least 3.00 for the last two years of baccalaureate study
4. (official transcripts must be submitted)
5. Current U.S. unencumbered RN licensure (upload Nursys verification report in application)
6. Three letters of recommendation
7. Current resume or curriculum vitae
8. Statement of goals
9. One year of experience as a registered nurse preferred – track specific experience desirable
10. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.
11. Interview may be required (via web, phone, or in person)
12. Successful passage of criminal background check and drug screen will be required upon offer of admission
13. Satisfaction of current health and immunization policy of the Department of Nursing will be required upon offer of admission

Degree Requirements
Students seeking the Master of Science degree with a major in Nursing at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the College of Nursing & Professional Disciplines.

1. A minimum of 30 semester credits in a major field.
2. At least one-half of the credits must be at or above the 500-level.
3. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.

Required Courses:
Family Nurse Practitioner

(mostly on-line courses)

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<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>NURS 500</td>
<td>Theories/Concepts Nursing</td>
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<tr>
<td>NURS 502</td>
<td>Evidence for Practice</td>
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<tr>
<td>NURS 505</td>
<td>Advanced Pharmacology</td>
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<td>NURS 522</td>
<td>Advanced Pathophysiology</td>
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<td>NURS 523</td>
<td>Health Promotion</td>
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<tr>
<td>NURS 532</td>
<td>Family Centered Advanced Practice Nursing</td>
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<tr>
<td>NURS 534</td>
<td>Management of Health Conditions in Primary Care I</td>
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<tr>
<td>NURS 540</td>
<td>Management of Health Conditions in Primary Care II</td>
</tr>
<tr>
<td>NURS 544</td>
<td>Pharmacotherapeutics for Primary Care</td>
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<td>NURS 553</td>
<td>Role Development of the NP</td>
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<tr>
<td>NURS 559</td>
<td>Maternal and Child Health in Primary Care</td>
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<tr>
<td>NURS 585</td>
<td>Advanced Health Assessment</td>
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<td>NURS 597</td>
<td>Advanced Clinical Practicum (I)</td>
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<td>Health Policy</td>
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<td>NURS 997</td>
<td>Independent Study</td>
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Total Credits: 49

Adult Gerontology Primary Care Nurse Practitioner

M.S. in Adult Gerontology Primary Care Nurse Practitioner (p. 509)

Courses

NURS 500. Theories/Concepts Nursing. 3 Credits.
The focus of this core course is on analysis of current nursing and related theories and concepts which guide clinical practice, curriculum development, research, and nursing administration.
NURS 502. Evidence for Practice. 3 Credits.  
This course emphasizes the application of basic research concepts to the building of evidence-based practice in nursing. Advanced competencies are developed in searching and evaluating the literature, examining the merit of different types and levels of evidence, and analyzing the generalizability and implications for clinical practice. Prerequisites or Corequisites: Admission to one of the Graduate Nursing Tracks, NURS 560 and statistics and/or permission of instructor. F,S.

NURS 503. The Business of Practice. 2 Credits.  
This course focuses on the business aspects of inter-professional advanced practice in the complex health care environment. Prerequisite: Admission to the DNP Program.

NURS 504. Advanced Pharmacology I. 3 Credits.  
Pharmacodynamic and pharmacokinetic principles with a focus on clinical anesthesia practice. Physiologic systems and drug classifications are used; emphasis on therapeutic use, side effects, drug interactions, and contraindications of drugs used for intravenous anesthesia induction, inhalation, and balanced anesthesia maintenance. Pediatric and geriatric variations will be addressed. Prerequisite: Admission to Nurse Anesthesia Specialization.

NURS 505. Advanced Pharmacology. 3 Credits.  
The focus of this course is on the basic and advanced clinical concepts of pharmacology for the advanced practice nurse. Medication selection and administration will be addressed. Anatomy, physiology, and pathophysiology will be reviewed as appropriate to the physiologic system or medication class being discussed. Evidence-based guidelines with respect to the clinical application of medications utilized in selected acute and chronic health problems will be explored. Prerequisite or Corequisite: Admission to Graduate Nursing Program. F.

NURS 506. Advanced Pharmacology II. 3 Credits.  
Advanced pharmacology for clinical nurse anesthesia practice. Prerequisite: NURS 504.

NURS 507. Anesthesia Seminar and Clinical Practicum. 4 Credits.  
This course is designed to provide nurse anesthesia students an overview of the basic principles and skills needed to care for the routine surgical patient. Topics include difficult airway management, patient monitoring, patient preparation, positioning, patient safety, fluid and electrolyte management, documentation of anesthesia care, and an introduction to regional anesthesia. Analysis, integration, and utilization of research to improve practice is emphasized. The lecture content is reinforced through Clinical Simulation and laboratory experiences, allowing for immediate application of the lecture content and integration into the clinical setting. Students are introduced to the clinical setting through observational and hands-on experiences. Includes a clinical and/or laboratory component. Prerequisite: NURS 521.

NURS 508. Nurse Anesthesia Review Course. 1 Credit.  
This course is faculty guided and designed to assist students with their review of nurse anesthesia course and clinical material in preparation for the CCNA certification examination. Prerequisite: Completion of all Nurse Anesthesia Specialization coursework.

NURS 509. Foundations for Nurse Education. 3 Credits.  
This course begins to compare and contrast multiple roles and responsibilities of nurse educators in various settings in academic and health service. It will build the conceptual foundation for educational processes with emphasis on ethics, learning theories, taxonomies of learning and current evidence necessary for development of competencies necessary for the practice of educating. Students will begin to formulate their individual philosophy of teaching and learning. Prerequisite: Admission to the Nursing Graduate Program or consent of the instructor. Prerequisite or Corequisite: NURS 500. S.

NURS 510. Adv Physiology/Pathophysiology I. 3 Credits.  
Normal physiologic functions associated with cellular structure and environment. Physiologic and pathophysiologic functions of the human body and its organs systems, both separately and integrated in whole activities. Prerequisite: Admissions to graduate study.

NURS 511. Adv Physiology/Pathophysiology II. 3 Credits.  
Physiologic and pathophysiologic functions of the human body and its organ systems, both separately and integrated in whole activities. Prerequisite: NURS 510 or consent of instructor.

NURS 512. DNP Core Concepts I. 2 Credits.  
This course is an exploration of the core concepts that support the developing role of the DNP as a practice focused leader and researcher. Prerequisite: Admission to the DNP Program.

NURS 513. DNP Core Concepts II. 2 Credits.  
This course focuses on the concepts that support the development of the role of the DNP practice leader in the care of rural and vulnerable populations and issues related to planning and providing care for vulnerable and underserved populations. The primary content focus areas are epidemiology and vulnerability related to population and individual health. Prerequisites: Admission to the DNP Program and NURS 512. S.

NURS 514. Essentials in Epidemiology. 3 Credits.  
This course will emphasize the application of the principles of epidemiology as applied to the investigation and prevention of individual and population health problems. Students will evaluate care delivery models and analyze epidemiological data to develop and apply strategies for health promotion and disease prevention for individuals, aggregates, and populations. The core competencies will focus not only on the practice of public health, but also enhance practice for the clinician. Prerequisite: Admission to the Graduate School, MPH Program, or permission of the instructor. F,S.

NURS 515. Basic Principles of Anesthesia Practice I. 3 Credits.  
This course provides an introduction to the fundamental principles necessary for the safe, professional, and individualized anesthetic care of diverse patients. Foundational concepts such as chemistry and physics as they apply to anesthesia practice, pharmacology of anesthetic agents, uncomplicated airway management, anesthesia delivery systems, and physiological monitoring will be investigated. Low and high fidelity patient simulation will be utilized to develop the student’s cognitive and psychomotor skills which are essential to clinical anesthesia management. The course will conclude with a clinical component designed to acclimate beginning nurse anesthesia students to the clinical anesthesia arena. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. F.

NURS 516. Basic Principles of Anesthesia Practice II. 3 Credits.  
This course builds upon the fundamentals covered in Basic Principles of Anesthesia I, all of which are necessary for the safe, professional, and individualized anesthetic care of diverse patients. Concepts such as basic perioperative anesthetic management, pain management, regional anesthesia, difficult airway management, effective oral and written communication, and patient and healthcare provider safety are emphasized. Low and high fidelity patient simulation will be utilized to develop the student's cognitive and psychomotor skills which are essential to clinical anesthesia management. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S.

NURS 517. Anesthesia Seminar and Clinical Practicum II. 5 Credits.  
This course builds on the foundations learned in the prerequisite course. Advanced anesthesia principles are applied to various patient populations including the surgical patient with cardiovascular and respiratory diseases. Anesthesia care of other surgical populations including the trauma, orthopedic, urological, vascular, intra-abdominal and ENT patient will be explored. Important concepts include anatomical, physiological and pathophysiological, and pharmacological principles. Analysis, integration, and utilization of research to improve practice is emphasized. The lecture content is reinforced through simulated laboratory experiences, allowing for immediate application of the lecture content and integration into the clinical setting. A clinical rotation is included. Prerequisite: NURS 507.

NURS 518. Pharmacotherapeutics for Nurse Anesthesia. 2 Credits.  
The focus of this course in on advanced clinical concepts of pharmacology relevant to the nurse anesthetist during the perioperative period. This course utilizes concepts from NURS 505 Advanced Pharmacology and further advances the student’s knowledge in pharmacological concepts related to the practice of anesthesia. This course will examine the clinical application of anesthetic specific pharmacologic principles into formulating anesthetic plans for diverse patient populations. Prerequisite or Corequisite: NURS 505; Admission to the DNP Program - Nurse Anesthesia Track. S.

NURS 519. Practice Leadership. 2 Credits.  
This course focuses on practice leadership theories and strategies related to the role of the DNP advanced practice nurse within the complex health care system. Prerequisite: Admission to DNP Program or consent of instructor.
NURS 520. Prof Role Dvlpmnt/Nurse Ansthsia. 3 Credits.
The focus of this course is on the identification and analysis of the professional components of nurse anesthesia practice, emphasizing role development; management and leadership; medical, ethical and legal responsibilities; the provision of culturally competent care; and scope of professional practice. Other areas that will be explored include quality improvement, the legislative process, credentialing, professional organizations, conflict resolution, and self-care and stress management for the anesthetist. An in-depth analysis of current trends and issues affecting healthcare and the delivery of anesthesia services are included in the course content. Prerequisites: NURS 521 and NURS 507.
Corequisite: NURS 517.

NURS 521. Foundations of Anesthesia Practice. 3 Credits.
This course provides the foundation for nurse anesthesia practice. Lecture and discussion begin with an analysis of the history of anesthesia nursing, professionalism, and standards of care for the anesthetist. Safety in the nurse anesthesia environment will be emphasized. Additional content includes the applied chemical, physical, and biochemical concepts as they relate to anesthesia practice, including the mechanisms of anesthesia, medical mathematics, medical gas systems, laws governing gases, the anesthesia machine, monitoring principles and equipment, airway equipment and basic airway management, and universal precautions. Prerequisite: Admission to the Nurse Anesthesia Specialization.

NURS 522. Advanced Pathophysiology. 3 Credits.
This course presents a system-focused approach to alterations in normal physiological mechanisms that result in pathologic disease processes. Physiological changes are compared and contrasted over the lifespan and developmental cellular physiology, pathogenesis and clinical manifestations commonly observed in altered health states are reviewed. This knowledge serves as the foundation for advanced clinical assessment, decision making and management for the advanced practice nurse. Prerequisite: Admission to graduate study. F,S,SS.

NURS 523. Health Promotion. 3 Credits.
Paradigms in health promotion, health detection, and disease prevention across the lifespan are used in synthesis in theory and evidence-based primary care interventions. Prerequisite: Admission to the Nursing Graduate Program or consent of the instructor. F,S.

NURS 524. Anatomy for Nurse Anesthetists. 1 Credit.
This course builds upon the concepts and fundamentals of Basic Principles of Anesthesia I and II as it relates to the detailed regional anatomy of the human body. A cadaver laboratory experience will be utilized throughout the course to develop the student’s understanding of clinical anatomy related to the airway, central nervous system, peripheral nerves, cardiovascular system, and pulmonary systems within the context of anesthesia practice. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track.

NURS 525. Applied Multivariate Statistics. 3 Credits.
Principles, assumptions and applications of major multivariate statistical techniques commonly used in nursing and clinical health research. Prerequisite: Graduate level univariate statistics and admission to the Nursing Doctoral Program or consent of the instructor. F.

NURS 526. Ethical, Legal and Health Policy Issues. 3 Credits.
This course emphasizes health policy issues within the context of legal and ethical concepts. Students will examine and debate health policies in current context. Prerequisites: Admission to the DNP Program - Nurse Anesthesia Track. F.

NURS 527. Anesthesia Seminar and Clinical Practicum III. 5 Credits.
This course further builds on the foundations learned in prerequisite courses. Students will incorporate previously learned anatomy, physiology, pathophysiology, and patient management into the care of subspecialty patients and patients with complex co-existing diseases. Advanced anesthesia principles are applied to the OB, pediatric, geriatric, and neuro patient. The pharmacology and anesthesia management of these subspecialty populations and patients with various disease states, such as kidney, musculoskeletal, and endocrine disorders, will be explored. Analysis, integration, and utilization of research to improve clinical practice is emphasized. The lecture content is reinforced with a clinical experience that emphasizes anesthesia care for subspecialty populations. A clinical/laboratory component is included. Prerequisite: NURS 517.

NURS 528. Advanced Principles of Anesthesia Practice I. 4 Credits.
This course builds upon the nurse anesthesia foundations covered previously in the Basic Principles of Anesthesia I and II courses. An evidence based approach to the anesthetic evaluation, planning, and management of diverse and increasingly complex patient populations, such as those with pre-existing respiratory, cardiac, and renal diseases, will be the focus. The hands-on administration of safe, individualized, and comprehensive anesthetic plans of care to both simulated and actual patients will be introduced and emphasized. Low and high fidelity patient simulation will be utilized to continue developing the student’s cognitive and psychomotor skills which are essential to perform clinical anesthesia management. A clinical component will allow the student to apply theoretical principles to nurse anesthesia practice and to increase their clinical skills, knowledge, and autonomy. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track.

NURS 529. Advanced Principles of Anesthesia Practice II. 6 Credits.
This course builds on the foundations covered in Basic Principles of Anesthesia I and II along with Advanced Principles I including the evaluation, planning, and management of diverse and increasingly complex patient populations. Evidence based advanced principles of anesthesia care will be investigated in order to construct and implement comprehensive and individualized anesthetic plans of care for the management of subspecialty patients. Obstetrical and pediatric populations, as well as patients with complex co-existing diseases and/or those undergoing complex surgical procedures will be the focus. Low and high fidelity patient simulation will be utilized to continue developing the student’s cognitive and psychomotor skills which are essential to perform clinical anesthesia management. A clinical component will allow the student to apply theoretical principles to nurse anesthesia practice and to increase their clinical skills, knowledge, and autonomy. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track.

NURS 530. Research Design & Methods in Nursing. 3 Credits.
Prerequisite or corequisite: NURS 500 or consent of instructor.

NURS 531. Adult-Gerontology Illness Management I . 3 Credits.
This is the first of a two-course sequence that focuses on evidenced-based primary care diagnosis and management of common episodic/chronic problems encountered by young adults, adults and older adults and their social network in ambulatory, inpatient, and community settings. Physiological, psychosocial, and pharmacological interventions are integrated into the holistic care that incorporates age-related, cultural, family, and community variations. An on-campus intensive is required for this course. Prerequisites: NURS 511 and NURS 585.
Corequisite: NURS 597.

NURS 532. Family Centered Advanced Practice Nursing. 3 Credits.
Theoretical and scientific foundations for advanced practice nursing care for the family across the lifespan. Prerequisite: Admission to the DNP Program or consent of instructor. F.

NURS 533. Adult-Gerontology Illness Management II. 3 Credits.
This is the second of a two-course sequence that focuses on evidenced-based primary care diagnosis and management of common episodic/chronic problems encountered by young adults, adults and older adults and their social network in ambulatory, inpatient, and community settings. Physiological, psychosocial, and pharmacological interventions are integrated into the holistic care that incorporates age-related, cultural, family, and community variations. An on-campus intensive is required for this course. Prerequisite: NURS 531.
Corequisite: NURS 597.

NURS 534. Management of Health Conditions in Primary Care I. 3 Credits.
This is the first of a two-course sequence that focuses on evidenced-based primary care diagnosis and management of common episodic/chronic problems encountered by adults, including young adults, middle aged adults and older adults and their social network in ambulatory, inpatient, and community settings. Physiological, psychosocial, and pharmacological interventions are integrated into the holistic care that incorporates age-related, cultural, family, and community variations. Prerequisites: NURS 522 and NURS 585.
Corequisite: NURS 597 (II).

NURS 535. Advanced Pharmacology for Primary Care I. 2 Credits.
Pharmacological agents utilized to treat common acute and chronic health problems are explored in depth. The course focus is on advanced nurse practice roles related to prescription, pharmacological, and therapeutic applications of the drugs. Prerequisite: Admission to the Nursing Graduate Program or consent of the instructor. Prerequisite or corequisite: NURS 510.
F,S.
NURS 536. Advanced Nurse Educator Practice of Health Promotion. 2 Credits.
This practicum course affords the Nurse Educator student with opportunities to develop advanced skills in teaching-learning practices in the rural health care environments. The student will apply educational theories and best-evidence teaching strategies with a particular emphasis in education related to health promotion strategies. This course will include topics such as the Nurse Educator role to promote health in rural communities, assess health literacy, and develop appropriate patient educational materials. The practicum emphasizes health promotion education to meet diverse needs of rural dwelling patients, families and groups. Prerequisites: NURS 500, NURS 511, NURS 539, and NURS 514. Corequisite: NURS 526, and NURS 569. F.

NURS 537. Graduate Cooperative Education. 1-2 Credits.
The course focus is upon experience in advanced nursing practice integrating theory, research, and advanced practice in a specific area of nursing. Course overview: the purpose of this course is to provide the graduate nursing student with advanced nursing practice as an employee in a health care agency and to evaluate that experience in relation to the educational program. A clinical/laboratory component is included. Prerequisite: Permission of Graduate Director of Nursing. Repeatable to 9 credits.

NURS 538. Psych Diagnostic Reasoning. 2 Credits.
This course prepares students for advanced therapeutic communication, interviewing, and assessment of people with mental illness across the life span. Skills are developed in differential diagnoses of psychopathology within the scope and standards of advanced psychiatric mental health nursing practice. Clinical application is included. Prerequisite: Acceptance into the PMHNP program or permission of instructor. S.

NURS 539. Advanced Pharmacology for Primary Care II. 2 Credits.
Pharmacological agents utilized to treat common acute and chronic health problems are explored in depth. The course focus is on advanced nurse practice roles related to prescription, pharmacological, and therapeutic applications of the drugs. Prerequisite: Admission to nursing graduate program and NURS 535 or consent of instructor. F.S.

NURS 540. Management of Health Conditions in Primary Care II. 3 Credits.
Clinical decision making skills are developed in the diagnosis and management of acute and chronic health conditions throughout the lifespan. Health promotion, health protection, and disease prevention are emphasized. Prerequisite: NURS 534. F.S,SS.

NURS 541. Illness Management - Adult Gerontology I. 3 Credits.
This is the first of a two-course sequence focusing on evidence-based primary care specific to the adult-gerontology population which includes adolescents, young adults and frail, older adults. This course prepares students to provide healthcare services across the adult-gerontology age spectrum from wellness to illness, using scientific knowledge and theoretical foundations to differentiate between normal and abnormal changes in physiological, psychological and sociological development and aging. Students will develop strategies to provide and coordinate interdisciplinary and holistic care that incorporates age-related, cultural, family, and community variations. Prerequisites: NURS 522, NURS 585, and NURS 597 (I). Corequisite: NURS 597 (II). F.S,SS.

NURS 542. Professional Aspects of Nurse Anesthesia Practice. 3 Credits.
This course provides the entry-level nurse anesthesia student with a foundational knowledge of professional aspects related to nurse anesthesia practice. The focus of this course is on historical perspectives, professional role development, anesthesia business practices, and professional wellness. Prerequisite: Admission to the DNP Program - Nurse Anesthesia Track. F.

NURS 543. Illness Management - Adult Gerontology II. 3 Credits.
This is the second of a two-course sequence that focuses on evidence based primary care specific to the adult-gerontology populations which includes adolescents and young adults to frail, older adults. Course work focuses on evidence based acute and chronic care diagnosis and management of common episodic acute and chronic problems encountered by the adult-gerontology population. Physiological, psychosocial, and pharmacological assessments, including changes associated with aging and development across the adolescent - adult continuum are integrated into the formation of differential diagnosis and interventions of clinical problems in collaboration with other care providers. Prerequisites: NURS 541 and NURS 597 (II). Corequisite: NURS 597 (III). F.S,SS.

NURS 544. Pharmacotherapeutics for Primary Care. 2 Credits.
This course will help prepare the advance practice nursing student for prescriptive authority. Topics will focus on decision making regarding the pharmacological management of common acute and chronic illnesses encountered in primary care settings. Pharmacokinetics, pharmacodynamics, adverse drug reactions, and contraindications will be discussed. Ethical and legal principles of writing prescriptions will also be covered. Students will synthesize research findings related to various medications using case study and discussion. Prerequisites: Admission to DNP program (FNP, AGNP tracks), and NURS 505. S.

NURS 545. Care of the Frail Older Adult. 3 Credits.
In this course the advanced practice nursing student will focus on the complex and multifactorial health care needs of frail elders. Students will develop strategies to provide and coordinate interdisciplinary and holistic care of the frail elderly in a variety of settings. Prerequisite: Admission to DNP program or consent of instructor. S.

NURS 546. Advanced PHN I. 4 Credits.
NURS 546 introduces concepts foundational to advanced PHN practice and population health. Corequisite: NURS 547.

NURS 547. Advanced PHN Practicum I. 4 Credits.
The focus of this course is on application of foundational concepts of Advanced PHN practice. Students will conduct a community assessment and identify community problems and strengths. Written and oral communication skills are emphasized. Corequisite: NURS 546.

NURS 548. Advanced PHN II. 3 Credits.
This course focuses on the leadership role of advanced PHN practice. Public health and community-based organizational assessment, program monitoring and evaluation, quality improvement, and management of multiple projects are emphasized. Concepts of leadership in public and community health and collaborative interdisciplinary practice are discussed. Health policy and law and ethics as they relate to public health are explored. In addition, advanced PHN leadership in rural areas and in disaster/emergency preparedness and management are discussed. Prerequisites: NURS 502, NURS 546, and NURS 547. Corequisite: NURS 549.

NURS 549. Advanced PHN Practicum II. 3 Credits.
This course focuses on implementation of advanced PHN interventions. Corequisite: NURS 548.

NURS 550. Global Public Health Issues. 2 Credits.
This course focuses on population health issues at a global level. Differences in population health status between developing and developed countries are explored. Special emphasis is placed on war as a public health issue and the global impact of AIDS.

NURS 552. Role Development of the CNS. 2 Credits.
Students will compare and contrast the various roles of the clinical nurse specialist and evaluate those roles as they relate to their individual area of practice. Concepts of professional development are emphasized. Prerequisite: NURS 502.

NURS 553. Role Development of the NP. 2 Credits.
This course emphasizes professional role development of the nurse practitioner. Students will compare and contrast the various roles of the nurse practitioner and evaluate those roles as they relate to the student’s individual planned area of practice. Prerequisite: NURS 502.

NURS 554. Writing for Publication. 2 Credits.
The course is designed to provide students with knowledge and skills necessary to meet the PhD program requirement and milestone of preparing and submitting a manuscript for publication in a peer-reviewed journal. The achievement of this milestone is foundational for scientific inquiry and the development of nurse scientists. Prerequisite: Consent of Instructor or Advisor. S/U grading. F.S,SS.

NURS 555. Grant Submission. 2 Credits.
The course results in the development and submission of a pre-doctoral, federally-funded research grant proposal, or equivalent with advisor approval. The course builds upon previous doctoral coursework covering grantmanship and issues in preparing funded research proposals and grant budgets. Prerequisites: NURS 573 and consent of Instructor or Advisor. F.S,SS.
NURS 556. PhD Student Intensive. 1 Credit.
This course submerges the student into a community of scholars during an annual on-campus intensive experience. The student will participate in a variety of presentations, workshops, and activities which focus on development into the role of a nurse scientist and scholar. The course uses a variety of activities which help the student develop into the role of a nurse scientist and scholar. Prerequisite: Admission to the Nursing PhD program. Repeatable to 5 credits. S/U grading. F.S.

NURS 557. Foundations of Nursing Science. 3 Credits.
The epistemology and philosophy of nursing as an art and a science are examined. Patterns of knowing as well as clinical, conceptual, and empirical types of nursing knowledge will be discussed. The development of theory as a knowledge claim is analyzed. Prerequisites: Masters Level Nursing Theory Course and Admission to PhD Program. S.

NURS 558. Research Design. 3 Credits.
This course prepares the doctoral student to understand the link between research design and the study purpose. Prerequisite: Admission to PhD program or consent of instructor. F.

NURS 559. Maternal and Child Health in Primary Care. 2 Credits.
This course focuses on advanced practice nursing care of obstetric and pediatric clients within a primary care setting. An on-campus intensive is required for this course. Prerequisites: Admission to FNP, NURS 510, NURS 511, NURS 523, and NURS 585. SS.

NURS 560. Clinical Anesthesia Practicum I. 5 Credits.
This is the first of five clinical practicum courses that build upon one another and provides students the opportunity to obtain the clinical experiences necessary to develop increasing proficiency in nurse anesthesia practice. The emphasis of this course is the integration of current evidence and advanced nursing knowledge with decision making and case management for diverse, but less complex, patient populations receiving anesthesia care. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S/U grading. S.

NURS 561. Clinical Anesthesia Practicum II. 3 Credits.
This is the second of five clinical practicum courses designed to provide the student with the opportunity to obtain clinical experiences necessary to develop increasing proficiency in nurse anesthesia practice. The emphasis of this course is the integration of current evidence and advanced nursing knowledge with decision making and case management for the diverse and increasingly more complex patient populations receiving anesthesia care. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S/U grading. SS.

NURS 562. Clinical Anesthesia Practicum III. 4 Credits.
This is the third of five clinical practicum courses that provides the student with the opportunity to obtain clinical experiences necessary to develop increasing proficiency in nurse anesthesia practice. The emphasis of this course is the integration of current evidence and advanced nursing knowledge with decision making and case management for the diverse, increasingly complex, patient populations receiving anesthesia care. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S/U grading. F.

NURS 563. Clinical Anesthesia Practicum IV. 6 Credits.
This is the fourth of five clinical practicum courses that provides the student with the opportunity to obtain clinical experiences necessary to develop increasing proficiency in nurse anesthesia practice. The emphasis of this course is the integration of current evidence and advanced nursing knowledge with decision making and case management for diverse patient populations, of all acuity levels, receiving anesthesia care. Emphasis will also be placed on student autonomy, continuing professional role development, and leadership skills. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S/U grading. S.

NURS 564. Psychopharmacology. 2 Credits.
This course provides the advanced practice student with knowledge in the pharmacology of psychopathology across the life span. Emphasis will be placed on the appropriate use of pharmaceuticals for psychiatric disabilities/disorders including: Mood disorders, development disorders, psychotic disorders, anxiety disorders, dementia, and substance abuse. Prerequisite: Admission to PMHNP program or permission of instructor. S.

NURS 565. Rural Populations and Rural Health. 3 Credits.
This course provides an overview of characteristics of rural populations and rural health. Factors that contribute to health, morbidity, and mortality are examined, and the compounded vulnerability of rurality and disadvantaged groups is analyzed. Prerequisite: A graduate level Epidemiology course or permission of instructor. S.

NURS 566. Curriculum Development. 3 Credits.
This course focuses on the curriculum development process. Societal, professional, and institutional factors as well as current research findings influencing the curriculum development process are analyzed. Consideration of the impact of adult learning principles, workforce issues, legal-ethical concerns, and diverse student populations in regard to the curriculum development process is given. Prerequisite: NURS 509.

NURS 567. Teaching Methodologies. 3 Credits.
The course explores theory-based teaching strategies designed to develop cognitive abilities, psychomotor skills, and affective qualities in learners from diverse backgrounds. Strategies and methods for the teaching of nursing content in a variety of settings are utilized. The use of technological tools in nursing education is evaluated. Prerequisite or corequisite: NURS 566.

NURS 568. Teaching Practicum. 2 Credits.
Students assume the role of the nurse educator in selected learning settings under the guidance of a preceptor. A clinical/laboratory component is included. Prerequisites: NURS 566 and NURS 567 and NURS 569, or consent of instructor.

NURS 569. Assessment and Evaluation. 3 Credits.
Principles of assessment, measurement, and evaluation are analyzed in this course as they relate to nursing education. The processes of assessing student learning, teaching, and program outcomes are explored. Topics relevant to the evaluation of individual student learning such as test development, evaluation of critical thinking, and clinical evaluation are included. The processes of faculty and program evaluation are examined. Prerequisites: NURS 556 and NURS 567, or consent of instructor.

NURS 572. Diverse Vulnerable Populations. 3 Credits.
Students will explore a wide range of concepts as they apply to diverse and vulnerable populations. The focus of the course is on understanding concepts and principles important to nursing when doing research, planning health care, developing health policy, and teaching in this area. Prerequisite: Admission to the Nursing Graduate Program or consent of the instructor.

NURS 573. Research Funding. 3 Credits.
This course integrates the scientific and practical aspects of professional writing and grant proposal development to obtain funds for research. Prerequisite: Admission to the graduate nursing program or approval of instructor. Prerequisite or Corequisite: NURS 574 and/or NURS 575; Non-nursing programs: Graduate level quantitative and/or qualitative research methods coursework required. F.

NURS 574. Quantitative Nursing Methods. 3 Credits.
The purpose of this course is to acquire knowledge and skills necessary to apply quantitative research methods in nursing. The course includes substantial applications of established methodologies and effective research techniques within the quantitative paradigm. Prerequisite: Admission to the doctoral program and completion of a multivariate statistics course. S.

NURS 575. Qualitative Nursing Research. 3 Credits.
This course focuses on examination and analysis of qualitative research designs with particular emphasis on approaches relevant to phenomena in nursing. Students will conduct fieldwork to develop some beginning qualitative research skills. Prerequisite or Corequisite: Admission to Doctoral Program or consent of instructor. F.

NURS 576. Clinical Anesthesia Practicum V. 5 Credits.
This is the final capstone clinical practicum course that provides the student with the opportunity to develop full autonomy and proficiency in nurse anesthesia practice. The emphasis of this course is the integration of current evidence and advanced nursing knowledge with advanced clinical judgement, well developed clinical decision making, and total case management for diverse patient populations receiving anesthesia care. Professionalism and leadership within healthcare systems will be emphasized. Prerequisite or Corequisite: Admission to the DNP Program - Nurse Anesthesia Track. S/U grading. SS.
NURS 577. Rural Healthcare Ethics. 3 Credits.  
This course is directed toward the development of critical dialogue and leadership strategies for dealing with ethical issues related to nursing, health care and research. Commitment to discussion, understanding and acceptance of the rights of others in dilemmas is emphasized. Reflexive nursing, which brings attention to one’s own position and objectivity, is encouraged. The challenges of ethics in rural milieu are included in the discourse. Prerequisite: Admission to the Nursing doctoral Program or consent of the instructor. S.  

NURS 578. Doctoral Seminar. 1 Credit.  
Prerequisite: Admission to the Nursing doctoral Program or consent of the instructor.  

NURS 580. Research Practicum. 1-6 Credits.  
The doctoral research practicum provides a research experience for doctoral nursing students separate from the dissertation to participate in the research process under the guidance of an experienced/ funded investigator. Experiences may include grant writing, data collection, analysis, and manuscript writing. Repeatable to 6 credits. F,S,SS.  

NURS 581. The Nurse Scientist. 3 Credits.  
This course prepares the doctoral student to actively engage in doctoral study with knowledge of the discipline of nursing and skills that facilitate success as an emerging nurse scientist. Prerequisite: Admission to PhD program. F.  

NURS 583. Individual Therapy. 2 Credits.  
This course provides knowledge and skill development in the implementation of evidence-based clinical therapies and treatments focused on the individual including cultural variations. Includes clinical practice. Prerequisites or corequisites: NURS 500, NURS 502, NURS 510, NURS 511, NURS 514, NURS 523, NURS 535, NURS 538, NURS 539, and NURS 585.  

NURS 584. Group and Family Therapies. 3 Credits.  
Evidence-based clinical interventions with diverse groups and families are presented. Opportunities for clinical implementation accompany the theoretical models. A clinical/laboratory component is included. Prerequisites or corequisites: NURS 538, NURS 583 and admission into Psychiatric Mental Health specialization or consent of instructor.  

NURS 585. Advanced Health Assessment. 3 Credits.  
An evidenced-based approach will be used to present methodologies for graduate student performance on health histories, developmental assessments, and physical/psychosocial assessments of individuals. Communication and interviewing techniques for advanced nursing practice are applied. A clinical/laboratory component is included with variations for Family Nurse Practitioner, Psych/Mental Health, Adult-Gerontology, and Nurse Anesthesia students. An on-campus intensive is required for this course. Prerequisite: Completion of an undergraduate course in health assessment techniques or consent of instructor. Prerequisite or corequisite: NURS 510. F,S.  

NURS 586. Rural Health Programs and Research. 3 Credits.  
This course focuses on policies, programs and research related to rural health. Prerequisite: NURS 565 and NURS 558 or consent of instructor. F.  

NURS 588. Management of Psychopathology I. 2 Credits.  
This is the first of a two course sequence that focuses on the management of individuals across the lifespan, groups and families with or affected by psychopathology. Continuity of care across settings and community are emphasized. Prerequisites or Corequisites: NURS 564, NURS 584, and admission to the PMHNP program.  

NURS 589. Management of Psychopathology II. 2 Credits.  
This is the second of a two course sequence that focuses on the management of individuals across the lifespan, groups and families with or affected by psychopathology. Management of co-morbidities is emphasized. Prerequisite or Corequisite: NURS 588. S.  

NURS 590. Directed Studies. 1-3 Credits.  
Designed to meet the needs of individual and/or small groups of graduate students. The course content will be based on student interests and needs in conjunction with the faculty member’s area of specialization. Prerequisite: Consent of instructor. Repeatable.  

NURS 591. Readings in Nursing. 1-3 Credits.  
Readings in selected nursing/health care topics with written and/or oral reports. Prerequisite: Consent of instructor. Repeatable.  

NURS 592. Advanced PHN Practicum II. 4 Credits.  
This course provides a capstone experience in Advanced PHN practice. Students are expected to integrate knowledge from all of their previous coursework into an applied practicum experience in population health, to evaluate population health interventions and programs, and develop strategies for program funding. Prerequisites: NURS 548 and NURS 549.  

NURS 593. DNP Internship I. 4 Credits.  
This first DNP Internship course is designed to provide the DNA Advanced Practice Nurse (APN) student with opportunities to apply the concepts in the AACN DNA Essentials document in the practice environment. Students will also begin development of the DNA capstone project. Corequisite: NURS 598.  

NURS 594. DNP Internship II. 4 Credits.  
This course is designed to provide the DNP student with additional practice focused learning opportunities to apply the concepts in the AACN DNP Essentials document in the practice environment. The student will complete and disseminate findings from the capstone project. Prerequisite: NURS 593. Corequisite: NURS 599.  

NURS 595. DNP Internship III. 4 Credits.  
This course is designed to provide the DNP APN with additional practice focused learning opportunities to apply the concepts in the AACN DNP Essentials document in the practice environment. The student will complete the DNP capstone project and disseminate findings in presentations and publications. Prerequisites: NURS 593 and NURS 594. Corequisite: NURS 596.  

NURS 597. Advanced Clinical Practicum. 1-12 Credits.  
The clinical practicum course provides the student with the opportunity to obtain extended clinical experience in the area of specialization. The course focuses on the integration of theoretical knowledge into clinical practice. A clinical/laboratory component is included. Prerequisite: Completion of NURS 517 for Nurse Anesthesia specialization or completion of first year curriculum for the Family Nurse Practitioner, Psychiatric/Mental Health or Gerontology specializations. Repeatable. S/U grading.  

NURS 600. Integrated DNP Core Concepts I. 3 Credits.  
This course is an exploration of the core concepts that support the varying roles of the DNP prepared APN as a practice focused leader and clinical scholar. Development of practice focused leadership skills in the care of rural and vulnerable populations will also be addressed. Prerequisite: Admission to the DNP Program. F.  

NURS 601. Integrated DNP Core Concepts II. 3 Credits.  
This course builds upon content covered in Integrated DNP Core Concepts I. Students continue to explore core concepts that support the varying roles of the role of the DNP prepared APRN practice focused leader and clinical scholar. In addition, students will critically examine the historical evolution of epidemiology and epidemiological concepts relevant in advanced nursing practice. Prerequisites: Admission to the DNP Program and NURS 600. S.  

NURS 602. Evidence Based Research I. 3 Credits.  
This course focuses on the development of practice scholarship through the use of evidence to address clinical problems and inform future practice. Students in the class will define practice problems, evaluate evidence based methods to address those problems and design practice focused projects to measure outcomes. Middle range theories will also be explored and used as frameworks for study designs. Statistics and previous Evidence Based Practice course is highly recommended. Prerequisite or Corequisite: Admission to the DNP program. F.  

NURS 603. Evidence-Based Research II. 3 Credits.  
This course focuses on the continued development of the practice scholar and includes content of research and program evaluation methods and analysis used to address practice problems and inform future evidence based practice. Prerequisite: NURS 602. Corequisite: NURS 609. S.  

NURS 604. Health Informatics. 3 Credits.  
This course prepares the health care practice professional to use and evaluate emerging health care technology and data systems to support evidence-based practice. Prerequisite: Admission to DNP Program or consent of instructor. SS.  

NURS 605. Health Policy. 2 Credits.  
This course will prepare the health care professional to understand and apply knowledge of health policy to function as an advocate for populations and individuals. Prerequisite: Admission to the DNP Program or consent of instructor. SS.
NURS 606. DNP Systems Focused Practice I. 2 Credits.
This course is designed to provide the DNP student with opportunities to apply the concepts in the AACN DNP Essentials in the practice environment. Prerequisite: NURS 603. SS.

NURS 607. DNP Systems Focused Practice II. 3 Credits.
This course continues to provide the DNP student with opportunities to apply the concepts in the AACN DNP Essentials in the practice environment. Prerequisites: NURS 603 and NURS 606. F.

NURS 608. Healthcare Economics, Finance and Leadership. 3 Credits.
This course focuses on healthcare economics, finance and practice leadership skills related to the role of the DNP prepared advanced practice nurse within the complex health care system. Prerequisite or Corequisite: Admission to the DNP program or consent of instructor. F.

NURS 609. DNP Project Teams. 1-6 Credits.
The student will design, implement and evaluate the DNP project as well as present findings in the applicable practice setting under the guidance of DNP faculty. Prerequisite: NURS 603. Repeatable to 6 credits. F.S.SS.

NURS 610. DNP Capstone. 2 Credits.
The capstone course provides the DNP students with an opportunity to develop skills in reporting and disseminating practice focused research findings. Writing for publication of practice focused research is emphasized. Prerequisite or Corequisite: NURS 609. S,SS.

NURS 611. Rural Healthcare Forum. 1 Credit.
This course focuses on interprofessional healthcare delivery to rural and underserved populations. Prerequisite or Corequisite: Admission to DNP program or consent of instructor. SS.

NURS 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

NURS 997. Independent Study. 2 Credits.
Repeatable to 4 credits.

NURS 998. Thesis. 1-4 Credits.
Repeatable to 15 credits.

Master of Science in Adult Gerontology Primary Care Nurse Practitioner

Admission Requirements

Approved admission to the Master of Science degree program requires the following of all students:

1. Completion of a baccalaureate degree or higher from an accredited nursing program
2. An undergraduate or graduate statistics course
3. A minimum GPA of at least 3.00 for the last two years of baccalaureate study
   (official transcripts must be submitted)
4. Current U.S. unencumbered RN licensure (upload Nursys verification report in application)
5. Three letters of recommendation
6. Current resume or curriculum vitae
7. Statement of goals
8. One year of experience as a registered nurse preferred – track specific experience desirable
9. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.
10. Interview may be required (via web, phone, or in person)
11. Successful passage of criminal background check and drug screen will be required upon offer of admission
12. Satisfaction of health and immunization policy of the Department of Nursing will be required upon offer of admission

Degree Requirements

Students seeking the Master of Science degree with a major in Nursing at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies’ as well as particular requirements set forth by the College of Nursing & Professional Disciplines.

1. A minimum of 30 semester credits in a major field.
2. At least one-half of the credits must be at or above the 500-level.
3. A maximum of one-fourth of the credit hours required for the degree may be transferred from another institution.

Required Courses:

Adult-Gerontology Primary Care Nurse Practitioner

(mostly online courses)

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<th>Course</th>
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<tr>
<td>NURS 500</td>
<td>Theories/Concepts Nursing</td>
<td>3</td>
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<td>NURS 502</td>
<td>Evidence for Practice</td>
<td>3</td>
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<tr>
<td>NURS 505</td>
<td>Advanced Pharmacology</td>
<td>3</td>
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<td>NURS 522</td>
<td>Advanced Pathophysiology</td>
<td>3</td>
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<td>NURS 523</td>
<td>Health Promotion</td>
<td>3</td>
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<td>NURS 541</td>
<td>Illness Management - Adult Gerontology I</td>
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<td>NURS 543</td>
<td>Illness Management - Adult Gerontology II</td>
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<td>NURS 544</td>
<td>Pharmacotherapeutics for Primary Care</td>
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<td>Independent Study</td>
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Total Credits 47

Nutrition and Dietetics

M.S. in Nutrition (p. 510)

Accelerated B.S. in Dietetics/M.S. in Nutrition and Dietetics
(http://und-public.courseleaf.com/graduateacademicinformation/departamentalcoursesprograms/nutritiondietetics/accel)

Courses

N&D 541. Biochemical and Physiological Basis of Nutrition: Macronutrients. 3 Credits.
Integration of the molecular, cellular, and physiologic aspects of macronutrient and energy metabolism in humans. Dietary energy, carbohydrates, fiber, lipids, proteins, nutritional interactions and metabolic consequences with emphasis on recent advances in macronutrient nutrition are explored. Prerequisites: Undergraduate or graduate biochemistry and physiology. F, even years.

N&D 542. Biochemical and Physiological Basis of Nutrition: Micronutrients. 3 Credits.
Integration of the molecular, cellular, and physiologic aspects of vitamin and mineral metabolism in humans. Functions, biological availability, hormonal regulation, requirements, metabolic consequences of deficiencies or excesses, and interrelations with other nutrients with emphasis on current topics related to vitamins, minerals and phytochemicals. Prerequisites: Undergraduate or graduate biochemistry and physiology. S, odd years.

N&D 543. Advanced Topics in Lifecycle Nutrition. 3 Credits.
The course focuses on current and evolving research relating to the physiological changes and nutritional needs throughout the lifecycle. The course will also explore common nutrition-related conditions at each phase of the lifecycle, with emphasis on nutrition strategies to prevent and manage these conditions. On demand.
N&D 544. Obesity and Eating Disorders. 3 Credits.
The course examines the obesity epidemic, eating disorders, and prevention and treatment approaches at multiple levels: individual, social, environmental, and policy. Obesity, anorexia nervosa, bulimia nervosa, binge eating, and disordered eating will be discussed and evidence-based interventions explored with emphasis on role of the nutritionist as part of an inter-professional care team. Prerequisite: Admission to the program. On demand.

N&D 545. Nutrition in Disease Prevention and Wellness. 3 Credits.
An exploration of prevention and wellness models specifically designed to decrease the mortality and morbidity of chronic disease in the United States population. The course focuses on the involvement of optimal nutritional health in prevention of disease and promotion of wellbeing. Prerequisite: Admission to the program. On demand.

N&D 550. Nutrition Education and Program Planning. 3 Credits.
Theoretical, research and applied aspects of adult nutrition education. Curriculum design models, instructional tools, program planning and evaluation of education interventions will be discussed in the context of chronic disease prevention. Effective teaching strategies and procedural models for designing effective nutrition education programs targeting the general public will be presented. Prerequisite: Permission of Instructor. F, odd years.

N&D 552. Professional Nutrition Precepting. 1 Credit.
This course provides both didactic content and opportunities for nutrition professionals to become effective preceptors of nutrition/dietetics students. Under the direction of faculty, dietitians and nutritionists will precept undergraduates in supervised practice settings. S/U grading. On demand.

N&D 553. Nutritional Health Advocacy and Policy. 3 Credits.
An analysis of U.S. public policy processes in relation to food and nutrition, with emphasis on the role of the nutrition professional in influencing the public policy process and advocating for food policies. 3 graduate credit hours. Prerequisite: Admission to the program. On demand.

N&D 554. Nutrigenomics. 3 Credits.
This course explores the interactions between nutritional factors, genomics, and health. The course also explores the potential roles of the nutrition professional in developing personalize dietary prescriptions to optimize health, reduce disease risk, or improve management of chronic disease. Prerequisites: Undergraduate courses in biochemistry or advanced nutrition and human physiology. On demand.

N&D 555. Small Grant Proposal Development. 1 Credit.
Development of small grant proposals to support nutrition-related program planning and research studies. Prerequisite or Corequisite: ND 551 or N&D 594.

N&D 556. Nutrition Counseling. 3 Credits.
This course develops and strengthens advanced nutrition counseling skills using the evidence-based motivational interviewing style. The focus will be on attending to client-centered orientation and building therapeutic relationships through engaged communication skills. Core theories explored with emphasis on enhancing practical skill development through video demonstrations, real play, case studies, creative reflection, and facilitated group discussions. Prerequisite: Admission into the program. S, even years.

N&D 590. Directed Studies in Nutrition. 1-4 Credits.
Designed to meet the needs of an individual student or a small group of graduate students. Course content will be based on the interest and needs of the student(s) in consultation with the faculty member's area of specialization. Prerequisite: Consent of Instructor. On demand.

N&D 591. Seminar in Nutrition. 1 Credit.
Discussion of current research and evidence-based practice in nutrition. Practice of oral presentation of scientific data in a professional setting. On demand.

N&D 594. Research Methods in Nutrition. 3 Credits.
The course examines the scientific foundation of nutrition research and critiques nutrition research. Students develop a research proposal. Prerequisites: Graduate statistics and admission into the program. S, even years.

N&D 596. Nutrition Education and Counseling Practicum. 2 Credits.
A block of supervised practice experiences working with diverse populations in a nutrition clinic focusing on the development of advanced nutrition education counseling skills. Students will develop both group and individualized client-centered counseling approaches. Practicum is taken near completion of graduate coursework. Prerequisites: N&D 560, a minimum of 20 credits in graduate program, and declared specialization of nutrition education and counseling. Repeatable to 4 credits. SS, even years.

N&D 598. Dietetics Practicum. 2-4 Credits.
The graduate practicum provides an opportunity for you to advance your skills and experience working with professionals and clients in an assigned area of dietetics. You will be required to utilize critical thinking, clinical inquiry, informatics, and literature to demonstrate problem solving skills in practice. The expected outcomes of the practicum include the development and refinement of competencies required of an entry-level dietitian. The practicum is a culmination of the knowledge, skills and abilities you have developed in your student career in the dietetic program. It is a time of gaining experience, building confidence, and testing your abilities as a future dietitian. Minimum 90 contact hours completed onsite at assigned facility/agency. Prerequisites: Enrollment in the Coordinated Program in Dietetics and School of Graduate Studies; consent of program director. Repeatable to 4 credits. S.

N&D 997. Independent Study. 1-2 Credits.
Designed to meet the needs of an individual student or a small group of graduate students. Course content will be based on the interest and needs of the student(s) in consultation with the faculty member's area of specialization. Prerequisite: Consent of Instructor. On demand.

N&D 998. Thesis. 1-4 Credits.
A scholarly research project written under the mentorship of the student's advisor. Credit is given upon successful meeting of thesis requirements for the master's degree. Prerequisite: Consent of the instructor. Repeatable to 4 credits. On demand.

Undergraduate Courses for Graduate Credit

N&D 350. Medical Nutrition Therapy I. 3 Credits.
An evidence-based study and application of the nutrition care process. This includes nutritional assessment techniques, pathophysiology in disease, and medical nutrition therapy for common medical conditions. Prerequisite: N&D 325 and PPT 301. F.

N&D 450. Medical Nutrition Therapy II. 3 Credits.
An advanced level of evidence-based study and application of the nutrition care process. This includes pathophysiology in disease and medical nutrition therapy for medical conditions and comorbidities. Prerequisites: N&D 350 and N&D 441. F.

Master of Science in Nutrition

Admission Requirements

1. Completion of a bachelor's or higher degree in nutrition, dietetics or closely related field from a regionally accredited college/university.
2. Students must have a grade of "C" or better in undergraduate courses in advanced nutrition or biochemistry, human physiology and statistics.
3. Recency of courses will be evaluated.
4. Meet minimum requirements for admission set by the School of Graduate Studies, including English proficiency requirements.

Degree Requirements

Students seeking the Master of Science in Nutrition degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Department of Nutrition and Dietetics:

1. A minimum of 30 credits, including 16 credits of core requirements, 10-11 credits to complete one of the specializations, and 4 or less credits of electives.
2. A maximum of 9 credit hours required for the degree may be transferred from another institution and must meet the School of Graduate Studies transfer credit requirements.

3. Completion of a week-long, campus-based training in nutrition practice and research skills for students completing the Nutrition Education and Counseling specialization.

4. Successful completion of a comprehensive examination.

**Curriculum**

**Core course requirements:**

- Graduate level statistics course
- N&D 541 Biochemical and Physiological Basis of Nutrition: Macronutrients
- N&D 542 Biochemical and Physiological Basis of Nutrition: Micronutrients
- N&D 550 Nutrition Education and Program Planning
- N&D 591 Seminar in Nutrition
- N&D 594 Research Methods in Nutrition

**Nutrition Education and Counseling Specialization course requirements:**

- N&D 560 Nutrition Counseling
- N&D 605 Health Policy
- N&D 590 Directed Studies in Nutrition
- N&D 594 Research Methods in Nutrition
- N&D 606 Directed Studies in Nutrition
- N&D 597 Independent Study

**Electives**

- N&D Electives (availability based on instructional resources, student interest, and minimum enrollment)
- N&D 543 Advanced Topics in Lifecycle Nutrition
- N&D 544 Obesity and Eating Disorders
- N&D 545 Nutrition in Disease Prevention and Wellness
- N&D 552 Professional Nutrition Precepting
- N&D 553 Nutritional Health Advocacy and Policy
- N&D 554 Nutrigeneomics
- N&D 560 Nutrition Counseling
- N&D 555 Small Grant Proposal Development
- N&D 590 Directed Studies in Nutrition

**Nutrition Science Specialization course requirements:**

- NURS 510 Adv Physiology/Pathophysiology I
- NURS 511 Adv Physiology/Pathophysiology II
- NURS 554 Nutrigeneomics
- NURS 597 Independent Study

**Electives**

- N&D Electives (availability based on instructional resources, student interest, and minimum enrollment)
- N&D 543 Advanced Topics in Lifecycle Nutrition
- N&D 544 Obesity and Eating Disorders
- N&D 545 Nutrition in Disease Prevention and Wellness
- N&D 552 Professional Nutrition Precepting
- N&D 553 Nutritional Health Advocacy and Policy
- N&D 554 Nutrigeneomics
- N&D 560 Nutrition Counseling
- N&D 555 Small Grant Proposal Development
- N&D 590 Directed Studies in Nutrition

Electives can come from any department that has relevant coursework. Courses must be approved by the student's academic advisor and be included on the student's Program of Study before the course is taken. Graduate level courses taken prior to acceptance as a graduate student at UND may be included in the student's Program of Study with approval.

**Occupational Therapy**

Master of Occupational Therapy (p. 515)

Doctor of Occupational Therapy (p. 513)

OT 200. Introduction to Occupational Therapy. 2 Credits.

History, scope, objectives, and functions of Occupational Therapy. F.S.

OT 422. Anatomy Occupational Therapy. 5 Credits.

Detailed study of human anatomy, with an emphasis on skeletal muscle, its vasculature, and the peripheral nervous system. The laboratory portion of the course allows for a direct study of the human form through dissection of human cadavers. Prerequisite: Occupational Therapy majors only. SS.

OT 423. Fundamentals of Neuroscience for Occupational Therapy. 3 Credits.

Survey of the major theories of behavior, cognition, and neurological disorders based on experimental findings in neuroanatomy, neurophysiology, and neurobiology. Laboratory included. Prerequisite: Occupational Therapy majors only. F.

OT 424. Muscle Function in Health and Disease. 4 Credits.

The study of musculature acting on the extremities and trunk. Theory and techniques of musculoskeletal evaluation with analysis of normal and pathological human motion. Laboratory included. Prerequisite: Occupational Therapy majors only. S.

OT 425. Occupational Therapy with Infants and Pre-School Children. 4 Credits.

Normal and abnormal human development, conception through the pre-school years. Emphasis on reflexes, sensory systems, neurodevelopmental systems, illness and trauma, assessment procedures, treatment techniques, families and intervention teams, and treatment outcomes. Laboratory included. Prerequisite: Occupational Therapy majors only. S.

OT 427. Orientation to Occupational Therapy Theory. 3 Credits.

Orientation to human occupation, occupational performance assessment, theoretical practice models, and core processes in occupational therapy. Prerequisite: Occupational Therapy majors only. F.

OT 428. Quantitative Research Methods-O.T.. 3 Credits.

Design and implementation of quantitative research, the evaluation of quantitative research studies, the interpretation of statistics as applied to occupational therapy, and the process of presentation and publication of quantitative research projects. Laboratory included. Prerequisite: Occupational Therapy majors only. F.

OT 429. Occupational Therapy with School Age Children and Young Adults. 4 Credits.

Normal and abnormal human development, disease and disability, school age through young adulthood. Emphasis on assessment, intervention planning and program outcomes for individuals with disabilities in a variety of practice settings including school, community, and medicine. Laboratory included. Prerequisite: Occupational Therapy majors only. S.

OT 430. Psychosocial Aspects of Occupational Therapy for Children, Adolescents and Young Adults. 4 Credits.

Psychosocial development and interruptions to development in children, adolescents, and young adults, with emphasis on OT evaluation, treatment planning and implementation, and treatment outcomes. Laboratory included. Prerequisite: Occupational Therapy majors only. S.

OT 431. Medical Science I. 2 Credits.

First in a two-semester sequence of courses, which covers human body systems and disease and disability groups discussed from all aspects of comprehensive rehabilitation. Included are chronic illness, neurological and orthopedic conditions, general medicine and surgery, and sensory disabilities across the lifespan. Prerequisite: Occupational Therapy majors only. F.

OT 432. Medical Science II. 3 Credits.

Second in a two-semester sequence of courses, which covers human body systems and disease and disability groups discussed from all aspects of comprehensive rehabilitation. Included are chronic illness, neurological and orthopedic conditions, general medicine and surgery, and sensory disabilities across the lifespan. Integration included. Prerequisite: Occupational Therapy majors only. S.

OT 433. Group Leadership Skills in Occupational Therapy. 2 Credits.

Didactic and experiential learning in a small group setting. Provides students with opportunities to function as group facilitators in a variety of practice settings. Prerequisite: Occupational Therapy majors only. S.
OT 438. Practicum: Children/Adolescents. 1 Credit.
Observation and experience in a university-approved pediatric and/or adolescent facility; supervised by occupational therapists, educators, and allied health professionals. Prerequisite: Occupational Therapy majors only. S/U grading. S.

OT 451. Multicultural Competency in Occupational Therapy. 3 Credits.
Develop an understanding of and an appreciation for social-cultural and ethnic diversity and use that understanding to address issues, solve problems, and shape civic, personal, and professional behaviors. To recognize that diversity is intimately tied to the concepts of culture, race, language, identity and inter-group dynamics, as well as its applications to complex situations. These concepts are presented within the context of providing OT services. Prerequisite: Occupational Therapy majors only. S.

OT 452. Assistive Technology I. 3 Credits.
Introductory study of assistive technology devices and products, assessment, and application methods. Focuses on adaptations, modifications, and technology systems and services that assist individuals with disabilities in greater independence and accessibility across the lifespan. Laboratory included. Prerequisite: Occupational Therapy majors only. F,S.

OT 453. Physical Aspects of OT with the Maturing Adult. 5 Credits.
Study of the OT process as applied to physical dysfunction of the maturing adult. Emphasis is on OT evaluation, planning, implementation of treatment, and treatment outcomes. Laboratory included. Prerequisite: Occupational Therapy majors only. F,S.

OT 454. Gerontic Occupational Therapy. 2 Credits.
Occupational perspectives of the elderly, including age-related changes, assessment and intervention strategies and the role of occupational therapy in prevention and wellness programs. Laboratory included. Prerequisite: Occupational Therapy majors only. F,S.

OT 456. Psychosocial Aspects of OT with the Maturing Adult. 4 Credits.
Psychosocial development and interruptions to development in the maturing adult with emphasis on OT evaluation, treatment planning and implementation, and treatment outcomes. Laboratory included. Prerequisite: Occupational Therapy majors only. F,S.

OT 458. Qualitative Research Methods for Occupational Therapy. 3 Credits.
Design and implementation of qualitative research, evaluation of qualitative research studies, analysis and interpretation of qualitative data, and the process of publication and presentation of qualitative research projects. Laboratory included. Prerequisite: Occupational Therapy majors only. F.

OT 460. Introduction to Management and Leadership. 2 Credits.
Introduction to the management practices necessary to direct a quality health service and provide the knowledge and skills needed for entry-level leadership positions in OT practice. Focus is on clinical reasoning and critical analysis in administrative and management functions. Laboratory included. Prerequisite: Occupational Therapy majors only. F.

OT 461. Management in the U.S. Healthcare System. 2 Credits.
Provide an overview of health services systems in the US and current trends and issues facing OT within this system. Content includes: federal and state roles, reimbursement of health care services, regulation, community services, health service providers, consultative, non-traditional areas of practice, service delivery models, legalities, and health policy advocacy. Prerequisite: Occupational Therapy majors only. F.

OT 462. Physical Dysfunction Seminar and Practicum Integration. 3 Credits.
The student begins to integrate and synthesize the theoretical knowledge of physical function/dysfunction with clinical practice. It requires the application of foundational knowledge, tools and the theory of practice inherent in the role of an OT. Occupational therapy experiences in facilities, supervised by registered occupational therapists, qualified health professionals and university faculty. Prerequisites: OT 422, OT 423, OT 424, OT 425, OT 426, OT 427, OT 428, OT 429, OT 430, OT 431, OT 432, OT 433 and OT 438. F,S.

OT 463. Psychosocial Dysfunction Seminar and Practicum Integration. 3 Credits.
Integration and synthesizing of theoretical knowledge with clinical experience toward the application of therapeutic use of self, self-evaluation, and communication skills in professional development. Occupational therapy experiences in mental health field facilities, supervised by registered occupational therapists, qualified health professionals and university faculty. Prerequisites: OT 422, OT 423, OT 424, OT 425, OT 426, OT 427, OT 428, OT 429, OT 430, OT 431, OT 432, OT 433 and OT 438. F,S.

OT 469. Interprofessional Health Care. 1 Credit.
A process-learning course intended to provide experience in building a team of health professionals from different professions. The focus is on learning to work effectively with an interprofessional health care team. Emphasis is placed on effective teamwork, the unique contributions of different professions, patient or family centered approach in health care delivery, and awareness of potential medical errors. S/U grading. F,S.

OT 480. Introduction to Scholarly Writing in Occupational Therapy. 1 Credit.
This course is designed to provide students with an understanding of the expectations and mechanics of scholarly writing. It is the first step for the development of a scholarly paper that is a requirement of the MOT program. The course outcome is the development of a proposal in an area of interest to the student(s) which has been approved and supervised by a faculty advisor to meet the first requirement of OT 995 Scholarly Project in OT or OT 997 Independent Study. Course content includes the mechanics of writing, development, content and format of the scholarly paper; the use of appropriate resources; and a review of how to use the Publication Manual of the American Psychological Association and the OT department’s graduate student manuals. S.

OT 488. Elective Fieldwork in Occupational Therapy. 3-18 Credits.
Application of occupational therapy in evaluation and treatment in optional areas of student special interest in selected fieldwork facilities. Variable credits, repeatable, with maximal total of 18 credits. Prerequisite: Occupational Therapy majors only. Repeatable to 18 credits. S/U grading. F,S,SS.

OT 489. Independent Projects. 1-3 Credits.
Individual study and/or research in a particular area of interest for the students with approval of a supervising faculty member. Elective for OT majors. Prerequisite: Occupational Therapy majors only. Repeatable to 12 credits.

OT 490. Occupational Therapy Seminar. 1 Credit.
Foundational knowledge relevant to the preparation of an independent study proposal. Serves as the basis for OT 494: Directed Study in Occupational Therapy. Prerequisite: Occupational Therapy majors only. S/U grading. F.

OT 493. Workshop. 1-12 Credits.
A workshop course with topics dictated by faculty and student interests primarily for but not confined to continuing education. Prerequisite: Occupational Therapy majors only. Repeatable to 12 credits. S/U grading. On demand.

OT 494. Directed Study in Occupational Therapy. 1 Credit.
Development of a proposal in an area of interest to the student approved and supervised by faculty. Serves as the basis for OT 997: Independent Study or OT 995: Scholarly Project in OT. Prerequisite: Occupational Therapy majors only. S/U grading. S.

OT 496. Community Experience. 1-4 Credits.
Student initiates and participates in off-campus professional learning activities related to OT under joint faculty and on-site professional supervision. Prerequisite: Permission of Department. Repeatable to 12 credits. S/U grading. F,S,SS.

OT 497. Cooperative Education. 1-6 Credits.
Qualified students are employed by selected facilities to further understanding of occupational therapy and health-related service provision. Prerequisite: Occupational Therapy majors only. Repeatable to 12 credits. S/U grading. F,S,SS.

OT 504. Occupation and Vocation. 3 Credits.
Application of assessment and problem-solving skills necessary for remediation/rehabilitation of occupational performance deficits in the work realm. Laboratory included. Prerequisite: Occupational Therapy majors only. F,S.

OT 507. Innovative Management and Leadership. 3 Credits.
Develop and demonstrate an understanding of the skills necessary to plan, implement and evaluate programs and material for education, consultation and private practice. Prerequisite: Occupational Therapy majors only. F,S.

OT 508. Therapeutic Procedures and Modalities in Occupational Therapy. 2 Credits.
Occupational therapy theory and application of specific neuromuscular techniques and modalities to promote musculoskeletal function. Laboratory included. Prerequisite: Occupational Therapy majors only. F,S.
OT 509. Principles of Education in Occupational Therapy. 3 Credits.
Explores the methods and strategies used to develop, implement and evaluate education programs for students in academia and clinical settings, for patients/clients, businesses and professional staff. Information and discussion focus on the theory and research relevant to education in a variety of settings. Prerequisite: Occupational Therapy majors only. F,S.

OT 515. Integration of Occupational Therapy Theory. 3 Credits.
Analysis and applications of theoretical perspectives to occupational therapy process with individuals, groups, and service delivery systems. Prerequisite: Occupational Therapy majors only. F,S.

OT 582. Graduate Practicum. 1-3 Credits.
Supervised experience in a variety of OT practice settings. Students are afforded the opportunity to gain practical, on-the-job experience working in an area that matches the focus of their graduate study. Students will be supervised by on-site personnel. Prerequisite: Occupational Therapy majors only. Repeatable to 12 credits. S/U grading. F.S.SS.

OT 585. Fieldwork in Psychosocial Dysfunction. 9 Credits.
Application of occupational therapy in evaluation and treatment in psychosocial dysfunction fieldwork facilities. Three months full-time. Prerequisite: Occupational Therapy majors only. S/U grading. F.S.SS.

OT 587. Fieldwork in Physical Dysfunction. 9 Credits.
Application of occupational therapy in evaluation and treatment in physical dysfunction fieldwork facilities. Three months full-time. Prerequisite: Occupational Therapy majors only. S/U grading.

OT 589. Readings in Occupational Therapy. 1-2 Credits.
Selected readings in the student's area of interest with oral and/or written reports. Prerequisite: Occupational Therapy majors only. Repeatable to 6 credits. F.S.SS.

OT 593. Teaching Experience in Occupational Therapy. 1-3 Credits.
Supervised experience in higher education teaching in OT. Projects in course/curriculum development, writing course objectives, writing and delivering lectures and learning activities, and developing assessment tools for the classroom. Prerequisite: Occupational Therapy majors only. Repeatable to 12 credits. F.S.SS.

OT 599. Special Topics in Occupational Therapy. 1-2 Credits.
A series of lectures, discussions, and/or laboratory experiences developed around one or more specific topics in occupational therapy. Prerequisite: Occupational Therapy majors only. Repeatable to 6 credits. F.S.SS.

OT 995. Scholarly Project in Occupational Therapy. 2 Credits.
A collaborative investigation of a relevant professional topic and production of a scholarly report with approval of the major faculty. Prerequisite: Occupational Therapy majors only. F,S.SS.

OT 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

OT 997. Independent Study. 2 Credits.
Independent investigation of a relevant professional topic and production of an independent scholarly report with approval of the major faculty advisor. Prerequisite: Occupational Therapy majors only. F.S,S,S.

Doctor of Occupational Therapy

The OTD degree will be offered beginning Fall 2019.

The Occupational Therapy Department offers a 3-year entry level Occupational Therapy Doctorate (OTD) degree. Occupational therapy is a profession that believes occupation, and especially occupational participation have the power to impact humans’ state of personal health. UND has two campuses offering the entry level Occupational Therapy Doctorate. The main campus is located in Grand Forks, ND, and the satellite is located in Casper, WY. For information regarding the program, the website is http://www.med.und.edu/occupational-therapy/.

The Occupational Therapy Program has applied for Candidacy status through the Accreditation Council for Occupational Therapy Education (ACOTE). For information regarding accreditation, contact ACOTE at (301) 652-AOTA, or ACOTE at 4720 Montgomery Lane, Suite 200, Bethesda, MD 20814-3449. The web address is www.acoetonline.org (http://www.acoetonline.org). The national entry-level certification examination for occupational therapists is administered by the National Board for Certification in Occupational Therapy, Inc. (NBCOT, 800 South Frederick Avenue, Suite 200, Gaithersburg, MD 20877-4150, phone 301-990-7979 or http://www.nbcot.org/). Once accreditation has been granted, graduates of the program will be eligible to sit for the National Certification Examination for the Occupational Therapists, administered by NBCOT. After successful completion of this exam, the graduate will be an occupational therapist, registered (OTR). In addition, most states require licensure to practice; however, state licenses are usually based on the results of the NBCOT Certification Examination. A felony conviction may affect a graduate’s ability to sit for the NBCOT Certification Examination or attain state licensure.

Details pertaining to admission requirements, degree requirements and courses offered can be found in the Degree section.

Mission Statement

The Department of Occupational Therapy shares the mission of the University of North Dakota and the School of Medicine and Health Sciences to serve the public through: 1) teaching and preparation of highly skilled entry-level occupational therapists, 2) scholarly and creative activity, and 3) service. The mission is accomplished through integration of scholarly inquiry and application of occupation in teaching/learning and OT practice contexts. Best practices in the profession will reflect the exemplars of client-centeredness, occupation-centered, evidence-based, and culturally relevant practice. The skills for lifelong learning and ethical and effective leadership will be promoted to enhance the quality of life of all people with whom we engage.

Program Goals:
Art and Science of Occupational Therapy

- The student will utilize professional reasoning strategies to provide rationale for decisions made during the occupational therapy process.
- The student will demonstrate ability to accurately implement the OT process in all potential practice areas including evaluation, intervention, and outcomes.
- The student will develop and maintain a therapeutic relationship with clients in order to collaborate during the OT process that would benefit the client’s health and well-being.
- The student will act as a research user in planning and modifying intervention in light of evidence.
- The student will design, construct, and implement the process for building evidence to act as a research builder.

Professional Identity and Collaboration

- The student will analyze and articulate the role of occupation and its influence on health and wellness in the examination of the occupational nature of humans.
- The student will articulate an understanding of the history, values, and ethics of occupational therapy and advocate with confidence what occupational therapy can offer society.
- The student will apply occupational based theories and models of practice in order to construct, modify, and evaluate occupational performance related to the OT process.
- The student will actively participate in profession-specific and formal educational activities in a variety of contexts that enhance the role and awareness of occupational therapy demonstrating professional engagement.
- The student will apply skills necessary to effectively take part in intra/interprofessional collaborative practice.

Innovative and Intentional Leadership

- The student will evaluate factors influencing public policy and create a course of action for improving access to occupational therapy services.
- The student will make use of management skills to create occupational therapy services for individuals and organizations.
- The student will utilize leadership skills and strategies in preparation for innovative practice.

Diversity and Inclusive Participation


• The student will develop and practice relevant and culturally sensitive strategies and skills when interacting with consumers across occupational therapy practice to demonstrate cultural competence.

• The student will analyze the effects of health disparities and inequalities and will advocate to increase occupational engagement for all occupational beings to promote justice.

Admission Requirements

Pre-Occupational Therapy

Prior to admission, a minimum of 90 semester hours of credit from an approved college or university is required. Students should be broadly educated in the sciences and humanities. The CLEP in natural sciences will not meet the Biology and Chemistry requirements in Occupational Therapy. Students should carefully check all CLEP exams for potential acceptance at UND. A student must have achieved a minimum of a letter grade of C in all pre-requisite courses. The prospective student should include eight (8) credits from upper level courses, i.e., 300 and/or 400 numbers. Students may take additional electives from any field of study.

The following list of courses and credits indicates the core prerequisites all applicants must complete prior to admission to the occupational therapy program.

- Two semesters of Composition (6 credits)
- One semester of Public Speaking (3 credits)
- One semester of Biology and lab (4 credits)
- One semester of Chemistry and lab (4 credits)
- One semester of College Algebra (3 credits)
- One semester of Psychology or Sociology Statistics (3 credits)
- One semester of Developmental Psychology (4 credits)
- One semester of Abnormal Psychology (3 credits)
- One semester of Sociology (3 credits)
- One semester of Human Physiology (4 credits)
- One semester of Human Anatomy and laboratory (5 credits)
- One semester of Introduction to Occupational Therapy (2 credits)
- Essential Studies requirements

All of the prerequisite coursework must be completed before entering the professional program; however, the prospective student may be enrolled in pre-professional coursework at the time of application.

Occupational Therapy Doctorate

Early Entry Option: This option grants the student permission to start occupational therapy coursework in the 4th year of study after the completion of 90 credits including all pre-requisites. Students are not officially accepted to the OTD program until they have received their bachelor’s degree. Upon successful completion of the undergraduate degree and occupational therapy coursework-under-permission status, students following this track will be granted official acceptance into the OTD program. Students who do not successfully complete the first year occupational therapy coursework will not be admitted to the program and will not be allowed to take additional occupational therapy courses.

Admission to the professional program in occupational therapy is on a competitive basis with consideration given to pre-professional performance in the sciences, general graduation requirements, leadership potential, volunteer work and personal qualifications. Each application is thoroughly reviewed. This review includes the applicant’s academic record (must have a minimum overall GPA of 2.75 based on a 4 point scale or a GPA of at least 3.0 on the last 60 credits earned), pattern of withdrawals, incompletes, etc., elective coursework, volunteer and/or work experience, references, essay and a personal interview. Applicants are required to complete 60 hours of observation with a professional occupational therapy supervisor and hours should be distributed among psychosocial, physical dysfunction, and pediatric practice. Please refer to http://www.med.und.edu/occupational-therapy/ for more information about admission.

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. Completion of the application for admission to the professional program and UND School of Graduate Studies application form.
2. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.
3. Applicants who have received their bachelors or masters degree in the United States or English-speaking Canada are not required to submit the TOEFL or IELTS.

Bachelor of General Studies Degree with Health Studies Option

The Bachelor of General Studies Degree with Health Studies Option will be available to occupational therapy students who:

1. Have completed their pre-OT work either at UND or at another institution, and have not earned a previous baccalaureate degree.
2. Have successfully completed the first two semesters of the OT professional sequence. The BGS degree would normally then be awarded at the end of the second semester, if the student has completed all general UND university graduation requirements, including:
   - 120 total credits,
   - A minimum of 30 from UND,
   - 36 credits upper-level credits,
   - All essential studies requirements met (http://und.edu/academics/essential-studies/).

Plan of Study Grid

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<tr>
<td>Fall</td>
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<tr>
<td>OT 400</td>
<td>Culture &amp; Occupation</td>
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<td>OT 401</td>
<td>OT Process &amp; Practice Contexts</td>
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<td>OT 405</td>
<td>Forming Your Professional Identity</td>
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<td>Integration &amp; Fieldwork 1</td>
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<td>OT 403</td>
<td>Research Methods in OT</td>
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<td>OT 501</td>
<td>Interventions for Neuromusculoskeletal &amp; Movement Functions Applied to Occupational Performance</td>
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Master of Occupational Therapy

Admission Requirements

Pre-Occupational Therapy

The Occupational Therapy Department offers a five-year entry level Master of Occupational Therapy (MOT) Degree. Occupational Therapy as a profession is based on the belief that occupation, including its interpersonal and environmental components, may be used to prevent and mediate dysfunction and elicit maximum adaptation. UND has two campuses offering the Master's of Occupational Therapy degree. The main campus is located in Grand Forks, ND, and the satellite is located in Casper, WY. For information regarding the program, the website is: http://www.ot.und.edu

The Occupational Therapy Program is accredited by the Accreditation Council for Occupational Therapy Education (ACOTE). For information regarding accreditation, contact ACOTE at (301) 652-2682, or ACOTE, c/o Accreditation Department, 4720 Montgomery Lane, Suite 200, Bethesda, MD, 20814-3449. The website is www.acoteonline.org (http://www.acoteonline.org). All basic professional programs must comply with the Standards for an Accredited Educational Program for the Occupational Therapist, 2011. Graduates of the program will be able to sit for the national entry-level certification examination for the occupational therapist administered by the National Board for Certification in Occupational Therapy, Inc. (NBOTC, 12 South Summit Avenue, Suite 100, Gaithersburg, MD 20877; phone 301-990-7979). After successful completion of this examination, the graduate will be an Occupational Therapist Registered (OTR). Most states require licensure in order to practice; state licenses may be based on the results of the NBCOT certification examination. A felony conviction may affect a graduate’s ability to obtain a professional license to practice occupational therapy.

A pre-OT student typically spends the first two years as a pre-major at the University of North Dakota to complete the program prerequisites. In the beginning of the sophomore year when the student is completing the required courses as listed below, he/she must make written application for admission to the professional occupational therapy program. The CLEP in natural sciences will not meet the Biology and Chemistry requirements in Occupational Therapy. Students should carefully check all CLEP exams for potential acceptance at UND. A student must have at least a C in all prerequisite courses. The student must also obtain a minimum of a C in all professional level courses.

The following courses are required to be taken prior to professional program:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 110</td>
<td>College Composition I</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 130</td>
<td>Composition II: Writing for Public Audiences</td>
<td>3</td>
</tr>
<tr>
<td>COMM 110</td>
<td>Fundamentals of Public Speaking</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 150</td>
<td>General Biology I</td>
<td>4</td>
</tr>
<tr>
<td>&amp; 150L</td>
<td>General Biology I Laboratory</td>
<td></td>
</tr>
<tr>
<td>or BIOL 151 &amp; 151L</td>
<td>General Biology II Laboratory</td>
<td></td>
</tr>
</tbody>
</table>
when registering for the NBCOT exam: (NBCOT) certification examination or to attain state licensure as an
ability to sit for the National Board for Certification in Occupational Therapy
It is important to be aware that a felony conviction may affect a graduate's
Admission to the School of Graduate Studies requires:
Admission Requirements
Professional Program
Admission to the professional program in occupational therapy is on a
Year III Professional Program
The applicant must meet the School of Graduate Studies' current minimum
Year III Professional Program
The applicant must meet the School of Graduate Studies’ current minimum
general admission requirements as published in the graduate catalog.
Year III Professional Program
The applicant must meet the School of Graduate Studies’ current minimum
general admission requirements as published in the graduate catalog.
Year III Professional Program
The applicant must meet the School of Graduate Studies’ current minimum
1. Acceptance into the Professional Occupational Therapy program.
2. Successful completion of OT Professional Year I and II.
3. Completion of the School of Graduate Studies application forms.
4. Overall GPA of 2.75 or a 3.0 in both junior and senior years.
5. Satisfy the School of Graduate Studies’ English Language Proficiency
requirements as published in the graduate catalog.
6. Letter of endorsement from the Chair or Graduate Director of the
Department that assures automatic advancement in status from
the undergraduate program to the graduate program. The letter of
endorsement will be written for students in good academic and professional
status while in the professional program. The letter of endorsement from the
Chair or Graduate Director of the Department will assure automatic advancement in
status from the undergraduate program to the graduate program.

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CHEM 115</td>
<td>4</td>
</tr>
<tr>
<td>&amp; 11SL</td>
<td></td>
</tr>
<tr>
<td>or CHEM 121</td>
<td>3</td>
</tr>
<tr>
<td>&amp; 121L</td>
<td></td>
</tr>
<tr>
<td>MATH 103</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 111</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 241</td>
<td>4-3</td>
</tr>
<tr>
<td>or SOC 326</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 250</td>
<td>4</td>
</tr>
<tr>
<td>PSYC 270</td>
<td>3</td>
</tr>
<tr>
<td>ANAT 204</td>
<td>3</td>
</tr>
<tr>
<td>ANAT 204L</td>
<td>2</td>
</tr>
<tr>
<td>SOC 110</td>
<td>3</td>
</tr>
<tr>
<td>PPT 301</td>
<td>4</td>
</tr>
<tr>
<td>OT 200</td>
<td>2</td>
</tr>
<tr>
<td>Arts and Humanities Electives</td>
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<tr>
<td>Total Credits</td>
<td>57-56</td>
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</table>

* As a prerequisite for PSYC 241 Introduction to Statistics, student needs to take MATH 103 College Algebra.
** When completing Arts and Humanities courses, it is required that the nine credit hours be in two departments and you must have a minimum of three credits in fine arts as part of the requirements of the Essential Studies program at the University of North Dakota. You also want to ensure that you have fulfilled the global diversity requirement. More information on Essential Studies graduation requirements can be found at: http://www.und.edu/dept/registrar/EssentialStudies/esindex.html.

Degree Requirements
Bachelor of General Studies Degree with Health Studies Option
The Bachelor of General Studies Degree with Health Studies Option will be available to occupational therapy students who:
1. Have completed their pre-OT work either at UND or at another institution, and have not earned a previous baccalaureate degree.
2. Have successfully completed the first two years of the OT professional sequence. The BGS degree would normally then be awarded at the end of Professional Year Two, prior to beginning the Graduate School career, if the student has completed all general UND university graduation requirements, including:
   1. 120 total credits,
   2. A minimum of 30 from UND,
   3. 36 credits upper-level credits,
   4. All essential studies requirements met (http://und.edu/academics/essential-studies/).

Students seeking the Master of Occupational Therapy degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Occupational Therapy Department.

To maintain graduate student status, the professional level Year III student is required to maintain a GPA of at least 3.0 for all work completed in Year III. Students who were previously on academic or professional probation will be dismissed from the School of Graduate Studies if placed on one additional probation within the professional program.

M.O.T Curriculum Sequence

<table>
<thead>
<tr>
<th>PLAN OF STUDY GRID</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Professional Year 1</strong></td>
</tr>
<tr>
<td><strong>Summer</strong></td>
</tr>
<tr>
<td>OT 422 Anatomy Occupational Therapy 5</td>
</tr>
<tr>
<td>OT 426 Personal/Professional Development 1</td>
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<td><strong>Credits</strong></td>
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<tr>
<td>6</td>
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<tr>
<td><strong>Fall</strong></td>
</tr>
<tr>
<td>OT 423 Fundamentals of Neuroscience for Occupational Therapy 3</td>
</tr>
<tr>
<td>OT 425 Occupational Therapy with Infants and Pre-School Children 4</td>
</tr>
<tr>
<td><strong>Credits</strong></td>
</tr>
<tr>
<td>7</td>
</tr>
<tr>
<td><strong>Spring</strong></td>
</tr>
<tr>
<td>OT 427 Orientation to Occupational Therapy Theory 3</td>
</tr>
<tr>
<td>OT 428 Quantitative Research Methods-O.T. 3</td>
</tr>
<tr>
<td>OT 431 Medical Science I 2</td>
</tr>
<tr>
<td><strong>Credits</strong></td>
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<tr>
<td>15</td>
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</table>

| **Professional Year 2** |
| **Summer** |
| OT 424 Muscle Function in Health and Disease 4 |

University of North Dakota 743
### Fall and Spring Semester Electives:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>OT 429</td>
<td>Occupational Therapy with School Age Children and Young Adults</td>
<td>4</td>
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<tr>
<td>OT 430</td>
<td>Psychosocial Aspects of Occupational Therapy for Children, Adolescents and Young Adults</td>
<td>4</td>
</tr>
<tr>
<td>OT 432</td>
<td>Medical Science II</td>
<td>3</td>
</tr>
<tr>
<td>OT 433</td>
<td>Group Leadership Skills in Occupational Therapy</td>
<td>2</td>
</tr>
<tr>
<td>OT 438</td>
<td>Practicum: Children/Adolescents</td>
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**Credits:** 18

### Professional Year 2

#### Summer

**Elective Only Semester:**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>OT 488</td>
<td>Elective Fieldwork in Occupational Therapy</td>
<td>3-9</td>
</tr>
<tr>
<td>OT 497</td>
<td>Cooperative Education</td>
<td>1-6</td>
</tr>
<tr>
<td>OT 593</td>
<td>Teaching Experience in Occupational Therapy</td>
<td>1-3</td>
</tr>
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</table>

**Credits:** 1-9

#### Schedule A

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>OT 454</td>
<td>Gerontic Occupational Therapy</td>
<td>2</td>
</tr>
<tr>
<td>OT 456</td>
<td>Psychosocial Aspects of OT with the Maturing Adult</td>
<td>4</td>
</tr>
<tr>
<td>OT 458</td>
<td>Qualitative Research Methods for Occupational Therapy</td>
<td>3</td>
</tr>
<tr>
<td>OT 460</td>
<td>Introduction to Management and Leadership</td>
<td>2</td>
</tr>
<tr>
<td>OT 463</td>
<td>Psychosocial Dysfunction Seminar and Practicum</td>
<td>3</td>
</tr>
<tr>
<td>OT 469</td>
<td>Interprofessional Health Care (Schedule A or B)</td>
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**Credits:** 14-15

#### Schedule B

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<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>OT 452</td>
<td>Assistive Technology I</td>
<td>3</td>
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<tr>
<td>OT 453</td>
<td>Physical Aspects of OT with the Maturing Adult</td>
<td>5</td>
</tr>
<tr>
<td>OT 458</td>
<td>Qualitative Research Methods for Occupational Therapy</td>
<td>3</td>
</tr>
<tr>
<td>OT 460</td>
<td>Introduction to Management and Leadership</td>
<td>2</td>
</tr>
<tr>
<td>OT 462</td>
<td>Physical Dysfunction Seminar and Practicum</td>
<td>3</td>
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</table>

**Credits:** 17-18

#### Spring

**Schedule A

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>OT 451</td>
<td>Multicultural Competency in Occupational Therapy</td>
<td>3</td>
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<tr>
<td>OT 452</td>
<td>Assistive Technology I</td>
<td>3</td>
</tr>
<tr>
<td>OT 453</td>
<td>Physical Aspects of OT with the Maturing Adult</td>
<td>5</td>
</tr>
<tr>
<td>OT 461</td>
<td>Management in the U.S. Healthcare System</td>
<td>2</td>
</tr>
<tr>
<td>OT 462</td>
<td>Physical Dysfunction Seminar and Practicum</td>
<td>3</td>
</tr>
<tr>
<td>OT 480</td>
<td>Introduction to Scholarly Writing in Occupational Therapy</td>
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**Credits:** 16-17

#### Schedule B

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>OT 451</td>
<td>Multicultural Competency in Occupational Therapy</td>
<td>3</td>
</tr>
<tr>
<td>OT 454</td>
<td>Gerontic Occupational Therapy</td>
<td>2</td>
</tr>
<tr>
<td>OT 456</td>
<td>Psychosocial Aspects of OT with the Maturing Adult</td>
<td>4</td>
</tr>
<tr>
<td>OT 461</td>
<td>Management in the U.S. Healthcare System</td>
<td>2</td>
</tr>
<tr>
<td>OT 463</td>
<td>Psychosocial Dysfunction Seminar and Practicum</td>
<td>3</td>
</tr>
<tr>
<td>OT 469</td>
<td>Interprofessional Health Care (Schedule A or B)</td>
<td>1</td>
</tr>
<tr>
<td>OT 480</td>
<td>Introduction to Scholarly Writing in Occupational Therapy</td>
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**Credits:** 15

#### Fall and Spring Semester Electives:

<table>
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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>OT 489</td>
<td>Independent Projects</td>
<td>1-3</td>
</tr>
<tr>
<td>OT 490</td>
<td>Occupational Therapy Seminar</td>
<td>1</td>
</tr>
<tr>
<td>OT 493</td>
<td>Workshop</td>
<td>1-12</td>
</tr>
<tr>
<td>OT 494</td>
<td>Directed Study in Occupational Therapy</td>
<td>1</td>
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<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>OT 496</td>
<td>Community Experience</td>
<td>1-4</td>
</tr>
<tr>
<td>OT 497</td>
<td>Cooperative Education</td>
<td>1-6</td>
</tr>
<tr>
<td>OT 593</td>
<td>Teaching Experience in Occupational Therapy</td>
<td>1-3</td>
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**Credits:** 1-12

### Professional Year 3

#### Summer

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>OT 585</td>
<td>Fieldwork in Psychosocial Dysfunction</td>
<td>9</td>
</tr>
<tr>
<td>or OT 587</td>
<td>Fieldwork in Physical Dysfunction</td>
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**Credits:** 9

#### Fall

**Schedule A: On-Campus Required Core Courses:**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>OT 504</td>
<td>Occupation and Vocation</td>
<td>3</td>
</tr>
<tr>
<td>OT 507</td>
<td>Innovative Management and Leadership</td>
<td>3</td>
</tr>
<tr>
<td>OT 509</td>
<td>Principles of Education in Occupational Therapy</td>
<td>3</td>
</tr>
<tr>
<td>OT 515</td>
<td>Integration of Occupational Therapy Theory</td>
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**Credits:** 12

**Schedule B: Fieldwork

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>OT 585</td>
<td>Fieldwork in Psychosocial Dysfunction</td>
<td>9</td>
</tr>
<tr>
<td>or OT 587</td>
<td>Fieldwork in Physical Dysfunction</td>
<td>9</td>
</tr>
<tr>
<td>OT 995</td>
<td>Scholarly Project in Occupational Therapy</td>
<td>2</td>
</tr>
<tr>
<td>or OT 997</td>
<td>Independent Study</td>
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</tr>
<tr>
<td>OT 589</td>
<td>Readings in Occupational Therapy</td>
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**Credits:** 12-13

#### Fall Electives:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>OT 493</td>
<td>Workshop</td>
<td>1-12</td>
</tr>
<tr>
<td>OT 508</td>
<td>Therapeutic Procedures and Modalities in Occupational Therapy</td>
<td>2</td>
</tr>
<tr>
<td>OT 582</td>
<td>Graduate Practicum</td>
<td>1-3</td>
</tr>
<tr>
<td>OT 593</td>
<td>Teaching Experience in Occupational Therapy</td>
<td>1-3</td>
</tr>
<tr>
<td>OT 599</td>
<td>Special Topics in Occupational Therapy</td>
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**Credits:** 12

#### Spring

**Schedule A: Fieldwork

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
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<tr>
<td>or OT 587</td>
<td>Fieldwork in Physical Dysfunction</td>
<td>9</td>
</tr>
<tr>
<td>OT 995</td>
<td>Scholarly Project in Occupational Therapy</td>
<td>2</td>
</tr>
<tr>
<td>or OT 997</td>
<td>Independent Study</td>
<td>2</td>
</tr>
<tr>
<td>OT 589</td>
<td>Readings in Occupational Therapy</td>
<td>1-2</td>
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</tbody>
</table>

**Credits:** 12-13

**Schedule B: On-Campus Required Core Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<td>OT 504</td>
<td>Occupation and Vocation</td>
<td>3</td>
</tr>
<tr>
<td>OT 507</td>
<td>Innovative Management and Leadership</td>
<td>3</td>
</tr>
<tr>
<td>OT 509</td>
<td>Principles of Education in Occupational Therapy</td>
<td>3</td>
</tr>
<tr>
<td>OT 515</td>
<td>Integration of Occupational Therapy Theory</td>
<td>3</td>
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</table>

**Credits:** 12

#### Spring Electives

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>OT 493</td>
<td>Workshop</td>
<td>1-12</td>
</tr>
<tr>
<td>OT 508</td>
<td>Therapeutic Procedures and Modalities in Occupational Therapy</td>
<td>2</td>
</tr>
<tr>
<td>OT 582</td>
<td>Graduate Practicum</td>
<td>1-3</td>
</tr>
<tr>
<td>OT 589</td>
<td>Readings in Occupational Therapy</td>
<td>1-2</td>
</tr>
<tr>
<td>OT 593</td>
<td>Teaching Experience in Occupational Therapy</td>
<td>1-3</td>
</tr>
<tr>
<td>OT 599</td>
<td>Special Topics in Occupational Therapy</td>
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**Credits:** 12

**Total Credits:** 185-256

### Studies

* Department reserves the right to cancel a track and/or elective courses due to finances, staffing issues, or low enrollment. Electives are scheduled based on student interest and faculty resources. Class size may be limited.
Physical Therapy

Doctor of Physical Therapy (p. 520)

PT 101. Orientation Physical Therapy. 1 Credit.
Overview of the educational requirements, practice issues, and opportunities in the profession of physical therapy. Course content includes multimedia presentations, lectures, and observation in clinical settings.

PT 402. Professional Communication and Behavior. 2 Credits.
Lecture and practice in interprofessional and interpersonal communication including professional behavior, ethics, patient education, and written documentation. Prerequisite: Registered in Professional Physical Therapy Curriculum.

PT 409. Clinical Pathology I. 3 Credits.
Selected pathological conditions affecting the musculoskeletal system. Associated orthopedic diagnoses, surgical interventions, the influences of co-morbidities and pharmaceutical interventions, and safety concerns are discussed with an application to physical therapy patient/client management. Laboratory. Prerequisite: Registered in Professional Physical Therapy Curriculum. SS.

PT 410. Clinical Pathology II. 3 Credits.
Selected pathological conditions of body systems, associated surgical interventions, the influence of co-morbidities, pharmaceutical interventions, and safety concerns are discussed with application to physical therapy patient/client management. Laboratory. Prerequisite: Registered in Professional Physical Therapy Curriculum. SS.

PT 412. Biomechanics and Kinesiology. 4 Credits.
Biomechanics and kinesiology of musculature acting on the extremities and trunk. Clinical applications and evaluation of joint integrity and mobility, gait, range of motion and muscle performance. Laboratory. Prerequisite: Registered in Professional Physical Therapy Curriculum. S.

PT 413. Exercise in Health and Disease. 3 Credits.
Basic foundation for theoretical and practical application of exercise science principles for physical therapists. Exercise science principles are applied to healthy individuals and individuals with disease, impairments, and/or functional limitations. Examination and intervention procedures incorporate aerobic capacity/endurance, anthropometric characteristics, and muscle performance activities. Laboratory. Prerequisite: Registered in Professional Physical Therapy Curriculum. S.

PT 415. Motor Control. 3 Credits.
Lecture and laboratory work in therapeutic exercise to establish and maintain muscular control and coordination, including muscle re-education, facilitation, and relaxation. Laboratory. Prerequisite: Registered in Professional Physical Therapy Curriculum.

PT 417. Clinical Examination and Evaluation I. 4 Credits.
Emphasizes patient/client management elements of examination and evaluation. Emphasis is given to the musculoskeletal and neurological systems. Laboratory. Prerequisite: Registered in Professional Physical Therapy Curriculum.

PT 420. Musculoskeletal System Examination. 2 Credits.
Principles of musculoskeletal examination and evaluation including identification and palpation of surface anatomy, range of motion (ROM), measurement of joint ROM, and evaluation of muscle performance. Laboratory. Prerequisite: Registered in Professional Physical Therapy Curriculum. F.

PT 422. Anatomy for Physical Therapy. 5 Credits.
Detailed lectures and demonstrations on musculoskeletal anatomy and neuroanatomy. Laboratory. Prerequisite: Registered in Professional Physical Therapy Curriculum.

PT 423. Neuroscience for Physical Therapy. 4 Credits.
Structure and function of the human nervous system including pathophysiology and clinical applications relevant to physical therapy practice. Prerequisite: Registered in Professional Physical Therapy Curriculum. F.

PT 426. Manual Therapy I. 2 Credits.
Introduction to joint mobilization/manipulation techniques. Emphasis is on mobilization/manipulation as it relates to peripheral joints and soft tissues of the human body. Basic examination, evaluation, and intervention techniques for the spine are also presented. Laboratory. Prerequisite: Registered in Professional Physical Therapy Curriculum. S.

PT 425. Introduction to Patient/Client Care and Interventions. 4 Credits.
Basic physical therapy patient care skills addressing multiple areas of physical therapy practice. A sample of topics address injury to the integument, select interventions for all patients, positioning of patients, vital signs, aseptic technique, and basic wheelchair techniques. Laboratory. Prerequisite: Registered in professional physical therapy curriculum. F.

PT 490. Special Topics: Physical Therapy. 1-4 Credits.
Introduction and investigation of advanced clinical procedures and topics. Topics discussed will be dictated by student and faculty interests. Prerequisite: Registered in Professional Physical Therapy Curriculum. Repeatable to 4 credits.

PT 491. Independent Study. 1-4 Credits.
Research and independent study in a specialized area of Physical Therapy. Prerequisite: Registered in Professional Physical Therapy Curriculum.

PT 510. Integrated Clinical Experience. 1 Credit.
Short-term clinical experience to provide hands-on experience for students to apply knowledge learned during the first year of the professional program. Experiences will be set up in acute care, sub-acute care, long-term care, outpatient orthopedic, or a rural site. Prerequisite: Registered in Professional Physical Therapy Curriculum. Repeatable to 3 credits. F.S.SS.

PT 511. Applied Movement Science and Rehabilitation Procedures. 4 Credits.
Integration of clinical evaluation, functional goals, and treatment planning for individuals with neurological and multiple musculoskeletal dysfunction. The primary focus is on rehabilitation skills including assessment, exercise, handling techniques, functional activities, equipment prescription, patient education, and ADLs, as well as community mobility and governmental services. Laboratory. Prerequisite: Registered in Professional Physical Therapy Curriculum.

PT 512. Therapeutic Agents. 3 Credits.
Theory and application of various hydrotherapy, phototherapy, and thermotherapy modalities in Physical Therapy, including heat, light, sound, and water. Laboratory. Prerequisite: Registered in Professional Physical Therapy Curriculum.

PT 514. Case Management I. 2 Credits.
Integrates multiple aspects of case management, including examination, evaluation, diagnosis, prognosis, plan(s) of care, and intervention strategies. Evidence-based clinical decision making and verbal and written communications relative to case management will be emphasized. Prerequisite: Registered in Professional Physical Therapy Curriculum. SS.

PT 519. Electrotherapy and Electrodiagnosis. 2 Credits.
Theory and application of therapeutic electrical currents, biofeedback, electromyography, and nerve conduction velocity in physical therapy. Laboratory. Prerequisite: Registered in Professional Physical Therapy Curriculum.

PT 521. Critical Inquiry I. 1 Credit.
Introduction to the collection of clinical data leading to a case study report. Prerequisite: Registered in Professional Physical Therapy Curriculum.

PT 522. Administration in Physical Therapy. 3 Credits.
Lectures/discussion and seminar formats used to explore concepts of administration procedures as applied to Physical Therapy and the health care delivery system. Prerequisite: Registered in Professional Physical Therapy Curriculum.

PT 523. Lifespan I. 3 Credits.
Content related to human development; age-appropriate patient/client management; family-centered care; health promotion and safety; and legislative, policy, and systems are applied to pediatric patient/client management. Evidence-based practice for specific, common pediatric conditions is emphasized in the application of core content concepts. Laboratory. Prerequisite: Registered in Professional Physical Therapy Curriculum. S.

PT 524. Psychological Aspects of Disability. 2 Credits.
Readings and discussion course. Study of psychological coping mechanisms, reactions, and motivational factors pertinent to people with disabilities. Review of adjustment problems unique to specific disabilities and/or disease processes, including terminal illness. Prerequisite: Registered in Professional Physical Therapy Curriculum.
PT 525. Clinical Examination and Evaluation II. 3 Credits.
Emphasis is given to physical therapy examination, evaluation, and diagnoses as related to an advanced dynamic biomechanical evaluation. Also included will be the integration of NMS and support systems; clinical reasoning resulting in referral and/or modified physical therapy interventions; and the communication of findings and recommendations. Lecture Laboratory. Prerequisite: Registered in Professional Physical Therapy Curriculum. F.S.

PT 526. Manual Therapy II. 2 Credits.
Theory and application of manual therapy skills for examination and intervention techniques, including thrust and nonthrust mobilizations/manipulations of the spine, pelvis, and associated areas. Laboratory. Prerequisite: Registered in Professional Physical Therapy Curriculum. F.

PT 527. Critical Inquiry II. 2 Credits.
Application, analysis, and evaluation of clinical decision-making components, strategies, and skills. Preparation and presentation of a clinical case study. Prerequisite: Registered in Professional Physical Therapy Curriculum. S.

PT 528. Clinical Education I. 9 Credits.
The first in a sequence of four full-time clinical experiences in selected physical therapy provider centers throughout the United States. Prerequisite: Registered in Professional Physical Therapy Curriculum.

PT 529. Clinical Education II. 9 Credits.
The second in a sequence of four full-time clinical experiences in selected physical therapy provider centers throughout the United States. Prerequisite: Registered in Professional Physical Therapy Curriculum.

PT 535. lifespan II. 2 Credits.
Examine the factors and forces that affect life quality in later years. The physiological, psychological, and sociological aspects of aging will be considered, including those influences in the cultural context that enhance and impede continued growth of the person. Laboratory. Prerequisite: Registered in Professional Physical Therapy Curriculum.

PT 537. Strategies Early Intervention. 2 Credits.
This course is designed to review current practices in early intervention. Course materials will focus on characteristics of disabling conditions that influence growth and development of motor skills, cognition, and educational development. Emphasis will be on collaborative service provision with an interdisciplinary approach. Topics also covered include: current issues, assessment of the child/family unit, and legislative guidelines for service provision. Prerequisite: Registered in Professional Physical Therapy Curriculum.

PT 538. Advanced Topics in Pediatric Physical Therapy. 3 Credits.
This course is designed to present current and advanced topics relating to pediatric physical therapy clients and their families. Prerequisite: Registered in Professional Physical Therapy Curriculum.

PT 539. Prevention and Wellness. 2 Credits.
The theory and practice of prevention of injury, maintenance and improvement of wellness, and promotion of health and healthy behaviors across the lifespan. Concepts are applied to the general, athletic, and industrial populations, with a view to interprofessional involvement in wellness optimization. Prerequisite: Registered in Professional Physical Therapy Curriculum.

PT 540. Cardiopulmonary Physical Therapy. 2 Credits.
This course is designed to expand the theoretical understanding and clinical application of cardiopulmonary physical therapy examination, evaluation, diagnosis, prognosis, intervention and outcomes. Laboratory. Prerequisite: Registered in Professional Physical Therapy Curriculum.

PT 541. Clinical Examination and Evaluation III. 3 Credits.
Emphasizes patient/client management elements of examination and evaluation. Emphasis is given to systems screening, physical therapy diagnoses, and clinical reasoning resulting in referral and/or modified physical therapy interventions. Emphasis is also given to the communication of findings. Laboratory. F.

PT 544. Pharmacology for Physical Therapists. 1 Credit.
Pharmacological principles and implications for the clinical treatment of patients referred to physical therapy. Fundamentals of drug classification, actions of drugs, physiological mechanisms, and drug therapeutic and adverse effects. Prerequisite: Registered in Professional Physical Therapy Curriculum. SS.

PT 545. Medical Imaging for Physical Therapists. 2 Credits.
An introduction to medical imaging and an overview of its role in the health care delivery system. Topics include principles of medical imaging, imaging equipment, diagnostic imaging, and application of imaging principles to inform physical therapy care. Prerequisite: Registered in Professional Physical Therapy Curriculum. SS.

PT 549. Advanced Applied Anatomy/Clinical Kinesiology. 2 Credits.
Study of applied anatomy and its importance to research and clinical application, particularly as related to Physical Therapy. Prerequisite: Registered in Professional Physical Therapy Curriculum.

PT 550. Interprofessional Health Care. 1 Credit.
A process-learning course intended to provide experience in building a team of health professionals from different professions. The focus is on learning to work effectively with an interprofessional health care team. Emphasis is placed on effective teamwork, the unique contributions of different professions, patient or family centered approach in health care delivery, effective communication, and awareness of potential medical errors. Prerequisite: Registered in Professional Physical Therapy Curriculum. F.S.

PT 552. Clinical Education III. 9 Credits.
The third in a sequence of four full-time clinical experiences in selected physical therapy provider centers throughout the United States. Prerequisite: Registered in Professional Physical Therapy Curriculum.

PT 553. Clinical Education IV. 9 Credits.
The fourth in a sequence of four full-time clinical experiences in selected physical therapy provider centers throughout the United States. Prerequisite: Registered in Professional Physical Therapy Curriculum.

PT 561. Seminar: Physical Therapy. 1-4 Credits.
This course serves to focus student attention toward graduate study in Physical Therapy. Explore and discuss areas of interest for students and faculty. May repeat to 4 credits maximum. Prerequisite: Registered in Professional Physical Therapy Curriculum. Repeatable to 4 credits.

PT 562. Readings: Physical Therapy. 1-4 Credits.
Review of current literature pertinent to Physical Therapy; critical examination of design, content, and validity of conclusions. Prerequisite: Registered in Professional Physical Therapy Curriculum. Repeatable to 4 credits.

PT 572. Teaching Experience in Physical Therapy. 1-4 Credits.
Supervised experience in University teaching in Physical Therapy. Projects in curriculum development, formulation of teaching/learning objectives, teaching materials, evaluation tools, and experience in competency-based learning environment. Prerequisite: Registered in Professional Physical Therapy Curriculum. Repeatable to 4 credits.

PT 583. Critical Inquiry III. 1 Credit.
Introduction to research instruments including surveys, electrical and mechanical instrumentation critical to research methods. Includes discussion of validation, calibration, and reliability of instruments used in physical therapy research. Students develop a proposal for their scholarly projects and complete IRB use of human subject forms. Prerequisite: Registered in Professional Physical Therapy Curriculum.

PT 584. Evidence in Practice. 2 Credits.
Application of qualitative and quantitative research designs. Interpretation of statistical tests used in evidence-based medicine. Critical review of current articles related to diagnosis, prognosis, therapy, harm, cost, systematic reviews, meta-analysis, and clinical practice guidelines. Application of evidence to physical therapy practice. Prerequisite: Registered in Professional Physical Therapy Curriculum.

Individualized study of a particular area of interest for the student approved by his/her major advisor and supervised by preceptors with specialty and/or recognized expertise in the area of interest. Study may include library research, clinical research, discussion/seminars, projects, and directed clinical experience. Prerequisite: Registered in Professional Physical Therapy Curriculum. Repeatable to 12 credits.

PT 591. Research in Physical Therapy. 2 Credits.
Students develop the ability to effectively and accurately interpret and communicate results/clinical outcomes as a component of the written Scholarly Project. Frequent group and/or individual meetings with the advisor incorporate peer review discussion to facilitate student development of professional written and oral communication skills. Prerequisite: Registered in Professional Physical Therapy Curriculum. SS.
PT 592. Case Management II. 2 Credits.
Case management, with emphasis on the teaching and learning process and techniques targeted to promote and optimize physical therapy services, including advocacy. Strategies appropriate for conflict resolution are introduced. Professional development as a practitioner of physical therapy is emphasized through introduction and preliminary development of a portfolio. Prerequisite: Registered in Professional Physical Therapy Curriculum.

PT 995. Scholarly Project. 1 Credit.
Students provide a final written and oral report to the faculty on the results of their collaborative Scholarly Project. Prerequisite: Registered in Professional Physical Therapy Curriculum.

PT 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

PT 997. Research III: Independent Study. 2 Credits.

Doctor of Physical Therapy

Admission Requirements

Pre-Physical Therapy

Prior to admission, a minimum of 90 semester hours of credit from an approved college or university is required. Students should be broadly educated in the sciences and humanities. The Department of Physical Therapy recognizes that, since physical therapy deals with people, an understanding of literature, art, history, ethics, and philosophy is an adjunct to a physical therapist. Science and humanities are both viewed as necessary for the practice of physical therapy.

The following list of courses and credits indicates the core prerequisites all applicants must complete prior to admission to the physical therapy program. It is strongly recommended that students be computer literate prior to entering the professional program. Students may take additional electives from any field of study; however, the depth of the pre-physical therapy education should demonstrate that students have progressed from simple to complex studies in at least one content area. This requirement might be demonstrated by a discipline major, but in any case should demonstrate a basic comprehensiveness and integrity of study within a particular content area. This does not suggest that a separate undergraduate degree must be awarded; however, the breadth and depth in a discipline should be demonstrated. Course credits equivalent to a minor, i.e., approximately 20 credits at UND, in a particular discipline could accomplish this requirement. The prospective student should include eight (8) credits from upper level courses, i.e., 300 and/or 400 numbers.

- Two semesters of General Biology (8 cr.)
- Two semesters of General Chemistry (8 cr.)
- Two semesters of General Physics (8 cr.)
- One semester of Human Anatomy (3 cr.)
- One semester of Human Physiology (3 to 4 cr.)
- One semester of Introductory Psychology (3 cr.)
- One semester of Developmental Psychology (3 to 4 cr.)
- One semester of Abnormal Psychology (3 cr.)
- One semester of a Public Speaking course (3 cr.)
- One semester of an undergraduate statistics course (3 cr.)
- Essential Studies requirements

All of the prerequisite coursework must be completed before entering the professional program; however, the prospective student may be enrolled in pre-professional coursework at the time of application. All students must apply for the professional program through the PTCAS system. WICHE-eligible students should also apply through the WICHE certification process. Please refer to the UND-PT website at: www.med.und.edu/physical-therapy for application details.

Admission Requirements

Acceptance is on a competitive basis, with the major determinant being the basic science grade point average. The basic science GPA is defined as: biology (eight semester credits), chemistry (eight semester credits), physics (eight semester credits), anatomy (three semester credits), physiology (four semester credits), and psychology (seven semester credits). In addition to the science GPA, GRE score, and cumulative GPA, an interview and letters of reference will be considered in the admission process. Prospective students are expected to complete at least 60 hours of physical therapy observation prior to application.

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. Completion of the application for admission to the professional program and UND School of Graduate Studies application form.
2. Submission of scores from the Graduate Record Examination General Test.
3. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.
4. Applicants who have received their bachelors or masters degree in the United States or English-speaking Canada are not required to submit the TOEFL or IELTS.

Degree Requirements

1. Students must be formally accepted into the professional education component of the DPT and endorsed by the Chair of Physical Therapy. NOTE: Acceptance by the UND Office of Admissions or the School of Graduate Studies does not constitute acceptance into the professional program in Physical Therapy.
2. The professional education component of the DPT will require three academic years and two summer sessions following completion of the pre-physical therapy entrance requirements.
3. No student will be allowed to remain in the program or complete the full-time clinical experiences unless he/she attains a letter grade of at least “C” in the major courses.
4. To advance to candidacy, the student must successfully complete the first year comprehensive examination, and maintain a cumulative School of Graduate Studies GPA of # 3.00 AND/OR a summer session GPA of # 3.00. Students who fail to advance to candidacy during the first year will be dismissed from the professional program.
5. After advancement to candidacy, the student is expected to maintain a cumulative GPA of # 3.00. The School of Graduate Studies will monitor the cumulative GPA, which must be # 3.00. If the cumulative GPA is not # 3.00, the School of Graduate Studies policies for probation and dismissal will govern the student’s status.
6. Students in the professional program should be aware there are special requirements for clinical uniforms, professional liability insurance, medical insurance, immunizations, CPR certification, and completion of a criminal background check. These requirements must be met prior to any clinical contact with patients. The student will also be responsible for travel, housing, and food costs, in addition to the payment of tuition and fees, during the full-time clinical experience semesters. The majority of these experiences will be completed at geographical locations other than the City of Grand Forks.
7. Prospective students should be aware that a felony conviction may affect a graduate’s ability to obtain a professional license to practice physical therapy.
8. The faculty reserves the right to place on professional probation or to cancel the registration of any student in Physical Therapy whose performance in the classroom or the clinic is unsatisfactory.

Pre-Physical Therapy

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<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tr>
<td>ENGL 110</td>
<td>College Composition I</td>
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<tr>
<td>ENGL 130</td>
<td>Composition II: Writing for Public Audiences</td>
<td>3</td>
</tr>
<tr>
<td>COMM 110</td>
<td>Fundamentals of Public Speaking</td>
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<td>Fine Arts and Humanities</td>
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<td>BIOL 150</td>
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<td>BIOL 150L</td>
<td>General Biology I Laboratory</td>
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<tr>
<td>BIOL 151</td>
<td>General Biology II</td>
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<tr>
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<td>CHEM 121</td>
<td>General Chemistry I</td>
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<td>CHEM 121L</td>
<td>General Chemistry I Laboratory</td>
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<td>CHEM 122</td>
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<td>CHEM 122L</td>
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<td>Social Science</td>
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<tr>
<td>PSYC 111</td>
<td>Introduction to Psychology</td>
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</table>

University of North Dakota
**Bachelor of General Studies Degree with Health Studies Option**

This degree will be available to Physical Therapy students who:

1. do not already have a baccalaureate degree,
2. have completed at least 30 of the 90 pre-Physical Therapy credits at UND before beginning Professional Year One,
3. have successfully completed fall, spring and summer semesters of Professional Year One.

The BGS degree would normally then be awarded at the end of the summer semester of Professional Year One if the student has completed all general UND graduation requirements:

- 120 total credits,
- 30 credits from UND,
- 36 upper-level credits,
- all essential studies requirements.

**Professional Program - Physical Therapy**

**Professional Year 1**

**Fall**

<table>
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<tr>
<th>Course Code</th>
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<tr>
<td>PT 402</td>
<td>Professional Communication and Behavior</td>
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<tr>
<td>PT 420</td>
<td>Musculoskeletal System Examination</td>
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<tr>
<td>PT 422</td>
<td>Anatomy for Physical Therapy</td>
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<tr>
<td>PT 423</td>
<td>Neuroscience for Physical Therapy</td>
<td>4</td>
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<tr>
<td>PT 435</td>
<td>Introduction to Patient/Client Care and Interventions</td>
<td>4</td>
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<tr>
<td>PT 510</td>
<td>Integrated Clinical Experience (Each semester during year one, a small group of students will perform a learning event outside of the PT department.)</td>
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**Spring**

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<tr>
<td>PT 409</td>
<td>Clinical Pathology I</td>
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<tr>
<td>PT 412</td>
<td>Biomechanics and Kinesiology</td>
<td>4</td>
</tr>
<tr>
<td>PT 413</td>
<td>Exercise in Health and Disease</td>
<td>3</td>
</tr>
<tr>
<td>PT 415</td>
<td>Motor Control</td>
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<tr>
<td>PT 417</td>
<td>Clinical Exam and Evaluation I</td>
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<td>PT 426</td>
<td>Manual Therapy I</td>
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<td>PT 510</td>
<td>Integrated Clinical Experience (Each semester during year one, a small group of students will perform a learning event outside of the PT department.)</td>
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**Summer**

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<td>PT 410</td>
<td>Clinical Pathology II</td>
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<td>PT 510</td>
<td>Integrated Clinical Experience (Each semester during year one, a small group of students will perform a learning event outside of the PT department.)</td>
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PT 512 Therapeutic Agents 3

**Professional Year 2**

**Fall**

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<td>PT 528</td>
<td>Clinical Education I</td>
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<tr>
<td>PT 522</td>
<td>Administration in Physical Therapy</td>
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<td>PT 523</td>
<td>Lifespan I</td>
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<td>PT 524</td>
<td>Psychological Aspects of Disability</td>
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<td>PT 525</td>
<td>Clinical Examination and Evaluation II</td>
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<td>PT 527</td>
<td>Critical Inquiry II</td>
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<td>PT 540</td>
<td>Cardiopulmonary Physical Therapy</td>
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<td>PT 584</td>
<td>Evidence in Practice</td>
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<tr>
<td>PT 550</td>
<td>Interprofessional Health Care</td>
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**Spring**

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<td>PT 540</td>
<td>Cardiopulmonary Physical Therapy</td>
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**Professional Year 3**

**Fall**

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<td>Applied Movement Science and Rehabilitation Procedures</td>
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<td>PT 526</td>
<td>Manual Therapy II</td>
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<td>PT 539</td>
<td>Prevention and Wellness</td>
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<td>PT 541</td>
<td>Clinical Examination and Evaluation III</td>
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<td>PT 561</td>
<td>Seminar:Physical Therapy</td>
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<td>PT 592</td>
<td>Case Management II</td>
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<tr>
<td>PT 552</td>
<td>Clinical Education III</td>
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<td>PT 553</td>
<td>Clinical Education IV</td>
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<tr>
<td>PT 995</td>
<td>Scholarly Project</td>
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**Total Credits** 19

**Physician Assistant Studies**

Master of Physician Assistant Studies (p. 523)

**Courses**

**PA 507. Medical Human Anatomy & Radiology I. 3 Credits.**

This online course is a review of the basic principles of anatomy in preparation for the clinical phase of the PA program. The students will be introduced to components of radiologic diagnostic studies such as x-ray, CT scans and other forms of imaging. Prerequisite: Admission to Master of Physician Assistant Studies Program. SS.
PA 508. Medical Human Anatomy & Radiology II. 3 Credits.  
This course is held online and on the UND campus and is a continued review of the basic principles of anatomy in preparation for the clinical phase of the PA program. The students will review radiologic diagnostic studies such as x-ray, CT scans and other forms of imaging. Prerequisite: Admission to Master of Physician Assistant Studies Program. F.

PA 510. Human Physiology & Pathophysiology I. 4 Credits.  
This system-based online course focuses on the physiologic and pathophysiologic functions of the human body from the cellular level, to organ systems, with emphasis on genetics. This course lays the foundation for understanding the underlying principles of human disease processes across the lifespan. Prerequisite: Admission to Master of Physician Assistant Studies Program. F.

PA 511. Human Physiology & Pathophysiology II. 4 Credits.  
Continuation of PA 510. This system-based online course focuses on the physiologic and pathophysiologic functions of the human body from the cellular level, to organ systems. This course lays the foundation for understanding the underlying principles of human disease processes across the lifespan. Prerequisite: Admission to Master of Physician Assistant Studies Program and PA 510. F.

PA 512. History and Physical Exam I. 2 Credits.  
This online course focuses on patient assessment including communication strategies for interviewing and eliciting a medical history, techniques for performing a basic physical examination, and accurate documentation of patient data. Normal and abnormal findings involving patients across the lifespan are also presented. Instruction in preventive health, behavioral science and psychological development is also emphasized. Prerequisite: Admission to Master of Physician Assistant Studies Program. SS.

PA 513. History and Physical Exam II. 2 Credits.  
Continuation of PA 512. This course is online and concludes with instruction on the UND campus. The course focuses on patient assessment including communication strategies for interviewing and eliciting a medical history, techniques for performing a basic physical examination, and accurate documentation of patient data. Normal and abnormal findings involving patients across the lifespan are also presented. Instruction in preventive health, behavioral science and psychological development is also emphasized. Clinical skill labs are utilized to instruct physical examination skills while on campus. Prerequisite: Admission to Master of Physician Assistant Studies Program. F.

PA 516. EKG Interpretation. 1 Credit.  
This online course focuses on the principles and practical application of electrocardiography for the PA. Prerequisite: Admission to Master of Physician Assistant Studies Program. F.

PA 517. Pharmacology I. 2 Credits.  
This online system-based course focuses on the pharmacokinetic, pharmacodynamic, and pharmacogenetic concepts of the major drug classes across the lifespan. Federal regulations governing drug development, drug schedules, drug safety and legislation are included. In addition, drug interactions and contraindications and calculation of mathematical equivalents utilized in prescribing medications are reviewed. Prerequisite: Admission to Master of Physician Assistant Studies Program. SS.

PA 518. Pharmacology II. 2 Credits.  
Continuation of PA 517. This online system-based course focuses on the pharmacokinetic, pharmacodynamic, and pharmacogenetic concepts of the major drug classes across the lifespan. In addition, drug interactions and contraindications and complementary and over the counter medications are discussed. Prerequisite: Admission to Master of Physician Assistant Studies Program and PA 517. F.

PA 521. Diagnostic Studies I. 2 Credits.  
This online course focuses on laboratory, radiologic, and other diagnostic studies and acceptable values across the lifespan. Components encompass areas of radiology, hematology, chemistry, urinalysis, immunology, genetic and molecular testing and microbiology. Emphasis will include routine and preventative studies and differentiation of normal from abnormal diagnostic findings. Prerequisite: Admission to Master of Physician Assistant Studies Program. F.

PA 522. Diagnostic Studies II. 2 Credits.  
Continuation of PA 521. This online course focuses on laboratory, radiologic, and other diagnostic studies in relation to disease processes across the lifespan using a systems-based approach. Components encompass areas of radiology, hematology, chemistry, urinalysis, immunology, genetic and molecular testing and microbiology. Emphasis on systems such as cardiology, respiratory, and endocrinology that are consistent with the concurrent primary care course content. Emphasis will also include using diagnostic studies to help guide patient care. Prerequisites: Admission to Master of Physician Assistant Studies Program. S.

PA 523. Diagnostic Studies III. 2 Credits.  
Continuation of PA 522. This online course focuses on laboratory, radiologic and other diagnostic studies in relation to disease processes across the lifespan using a system-based approach. Components encompass areas of radiology, hematology, chemistry, urinalysis, immunology, genetic and molecular testing and microbiology. Emphasis on systems such as neurology, reproduction, and behavioral science that are consistent with the concurrent primary care course content. Emphasis will also include analyzing patient findings and formulating comprehensive diagnostic evaluations for medical management. Prerequisites: Admission to Master of Physician Assistant Studies Program. SS.

PA 525. Scholarly Project Development. 3 Credits.  
This online course provides a brief review of statistical principles as applied in medical literature with specific focus on research methods. Implementing principles of evidence-based medicine; students will learn to critically appraise the value and significance of medical research to determine application in clinical practice. Aspects of population health will also be discussed as students select a topic and complete a project proposal for the scholarly project. Prerequisite: Admission to Master of Physician Assistant Studies Program. SS.

PA 540. Clinical Medicine: Primary Care I - Didactic. 5 Credits.  
This didactic course is held online and on the UND campus. Content is focused on the problem solving process for the diagnosis and management of acute and chronic medical conditions across the life span. Emphasis is placed on analyzing symptoms of disease and formulating differential diagnoses using a system-based approach. Systems such as cardiology, respiratory and endocrinology are included. Pharmacology and pharmacotherapeutics used to treat acute and chronic conditions in system-based areas are included. Simulation and skill labs are utilized to further enhance critical thinking and medical decision making for treatment of patients across the life span. Prerequisite: Admission to Master of Physician Assistant Studies Program. S.

PA 541. Clinical Medicine: Primary Care I Clinical. 5 Credits.  
This supervised clinical practical experience in a primary care setting allows students to apply communication strategies for interviewing and eliciting a medical history, techniques for performing a basic physical examination, and accurate documentation of patient data. Students will also start to focus on analyzing symptoms of disease, formulating differential diagnoses and treatment plans for patients across the life span. Prerequisites: Admission to Master of Physician Assistant Studies Program. S.

PA 550. Clinical Medicine: Primary Care II - Didactic. 5 Credits.  
This didactic course is held online and on the UND campus. Content is focused on the problem solving process for the diagnosis and management of acute and chronic medical conditions across the life span. Emphasis is placed on analyzing symptoms of disease and formulating differential diagnoses using a system-based approach. Systems such as neurology, reproduction and behavioral science are included. Pharmacology and pharmacotherapeutics used to treat acute and chronic conditions in system-based areas are included. Emphasis also on managing patients in emergency settings. Simulation and skill labs are utilized to further enhance critical thinking and medical decision making for treatment of patients across the life span. Prerequisite: Admission to Master of Physician Assistant Studies Program. S.

PA 551. Clinical Medicine: Primary Care II - Clinical. 4 Credits.  
This supervised clinical practice experience in a primary care setting allows students to continue focusing and developing differential diagnoses and treatment plans for patients with complex medical disease across the life span. Prerequisites: Admission to Master of Physician Assistant Studies Program. SS.
PA 560. Clinical Medicine: Primary Care III - Didactic. 3 Credits.
This didactic course is held online and on the UND campus. Content is focused on the problem solving process for the diagnosis and management of acute and chronic medical conditions across the life span. Emphasis is placed on analyzing symptoms of disease and formulating differential diagnoses using a system-based approach. Systems such as hematology and conditions such as cancer are included. Pharmacology and pharmacotherapeutics used to treat acute and chronic conditions in system-based areas are included. Emphasis also on managing patients with multiple co-morbidities in emergency, clinical, and surgical settings. Simulation and skill labs are utilized to further enhance critical thinking and medical decision making for treatment of patients across the life span. Prerequisites: Admission to Master of Physician Assistant Studies Program.

PA 561. Clinical Medicine: Primary Care III - Clinical. 4 Credits.
This supervised clinical practice experience in a primary care setting allows students to continue focusing and developing differential diagnoses and treatment plans for patients with complex medical disease across the life span. Prerequisite: Admission to Master of Physician Assistant Studies Program.

PA 566. Professional Issues & Role Development I. 2 Credits.
This online course discusses role definition and historical development for the physician assistant within the health care industry. The importance of professionalism as an expression of positive values and ideals demonstrating a high level of responsibility, ethical practice and sensitivity to a diverse patient population is also discussed. Prerequisite: Admission to Master of Physician Assistant Studies Program.

PA 567. Professional Issues & Role Development II. 1 Credit.
Continuation of PA 566. This online course discusses further levels of professionalism with respect to adherence to legal and regulatory requirements, health care delivery systems and health policy, including rural and underserved populations. Cultural diversity and inclusion principles are also discussed. Prerequisites: Admission to Master of Physician Assistant Studies Program and successful completion of PA 566. SS.

PA 568. Professional Issues & Role Development III. 1 Credit.
Continuation of PA 567. This online course discusses additional aspects of professionalism including accountability to patients, society and the profession, commitment to excellence and ongoing professional development. The importance of intellectual honesty and appropriate conduct will also be discussed. Tills course will also assist in preparing the student for clinical employment by stressing the importance of the interview, contract negotiations, privileges, certification, licensure and maintenance. Prerequisites: Admission to Master of Physician Assistant Studies Program and successful completion of PA 567. F.

PA 569. Professional Issues & Role Development IV. 1 Credit.
Continuation of PA 568. This online course introduces the PA student to quality of care and reimbursement methods. Students will further understand the importance of patient safety and risk management as well as develop a response to medical ethics. Comprehensive role development will also prepare the student for entry level practice. Prerequisites: Admission to Master of Physician Assistant Studies Program and successful completion of PA 568. S.

PA 570. Clinical Medicine - Primary Care Clinical Continuation. 1-5 Credits.
Continuation - This supervised clinical practice experience in a primary care setting allows students to continue to focus and develop differential diagnoses and treatment plans for patients across the life span. Caring for rural or underserved patient populations will be the focus of this experience. Prerequisite: Admission to Master of Physician Assistant Studies Program. Repeatable to 7 credits. S/U grading. F,S,SS.

PA 571. Rural/Underserved Primary Care Clinical. 3 Credits.
This required supervised clinical practice experience in a rural or underserved primary care setting allows students to focus on analyzing symptoms of disease, formulating differential diagnoses and treatment plans for patients across the life span. Caring for rural or underserved patient populations will be the focus of this experience. Prerequisite: Admission to Master of Physician Assistant Studies Program.

PA 580. Specialty Clerkship. 5-6 Credits.
This supervised clinical practical experience is designed to expose the student to different disciplines of medicine to fulfill program requirements as determined by UND faculty advisor, community preceptor and PA student and as necessary for adequate entry level PA practice. One credit of PA 588 may be substituted for one of the required 6 credits. Prerequisite: Admission to Master of Physician Assistant Studies Program.

PA 581. Emergency Department Clerkship. 4 Credits.
This required supervised clinical practical experience focuses on analyzing symptoms and formulating differential diagnoses of emergent and traumatic condition across the life span. This clerkship is intended to provide the student with hands-on experience in the care of patients with urgent and emergent conditions. Prerequisite: Admission to Master of Physician Assistant Studies Program.

PA 582. General Surgery Clerkship. 4 Credits.
This required supervised clinical practical experience focuses on analyzing symptoms and formulating differential diagnoses of patients requiring surgical interventions. This clerkship is intended to provide the student with hands-on experience in the care of patients with surgical conditions. Emphasis is placed on the role of the PA in a surgical setting to enhance skills in sterile techniques, surgical assisting, suturing, documentation and pre-post-operative patient care. Prerequisite: Admission to Master of Physician Assistant Studies Program.

PA 588. Global Health Clerkship. 1 Credit.
Course content elective - This course emphasizes healthcare challenges and opportunities within vulnerable and underserved populations around the world and includes clinical hands-on experience in an international setting. Students will be responsible for any additional costs associated with this course including but not limited to: passports, visas, immunizations, travel, travel and health insurance, room and board, and any other incidental costs incurred during the rotation. One credit of PA 588 may be substituted for one of the credits required in PA 580. Prerequisites: Admission to Master of Physician Assistant Studies Program and approval from the Director of the Physician Assistant Program.

PA 589. Readings in Physician Assistant Studies. 1-2 Credits.
Course content elective - Selected review and reading of current professional literature in areas pertaining to the practice of a Physician Assistant. In collaboration with the faculty member, reading selection and method of evaluation are determined. Prerequisites: Admission to Master of Physician Assistant Studies Program and approval from the Director of the Physician Assistant Program.

PA 590. Continuing Enrollment in Physician Assistant Studies. 1-6 Credits.
Course content elective - This course provides additional time, if needed to complete required components of the Masters in Physician Assistant Studies. Repeatable to 12 credits. Maximum. Prerequisites: Admission to Master of Physician Assistant Studies Program and approval from the Director of the Physician Assistant Program. Repeatable to 6 credits. On demand.

PA 995. Scholarly Project. 3 Credits.
This online course allows the student to complete the scholarly project. Continued review and critique of the literature related to the topic area are required to formulate and write the final product. Students will also work with their advisor to objectively evaluate the scholarly project outcome. Prerequisite: Admission to Master of Physician Assistant Studies Program.

PA 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

Master of Physician Assistant Studies

Admission Requirements
Applicants who are seeking admission to School of Graduate Studies must meet all of the minimum general School of Graduate Studies admission requirements identified in the graduate catalog. In addition, the prospective student must fulfill the requirements for admission to the graduate program in the Department of Physician Assistant Studies. Admission to the Physician Assistant Program within the School of Medicine and Health Sciences at the University of North Dakota is a competitive selection process. Each applicant is reviewed individually and evaluated on their own merits.
Degree Requirements:

Bachelor’s degree or graduate degree at a regionally accredited institution within the United States.

Health Care Requirements:

Entry Point 1: Minimum of 3 years recent full-time experience as a licensed/certified health professional. Health care experience must include direct patient contact and high levels of responsibility involving complex critical thinking and decision-making skills.

Entry Point 2: Minimum of 500 hours (1000 preferred) direct hands-on supervised patient care.

Preceptor Requirements:

Entry Point 1: Apply as a team with a licensed physician (MD or DO) or physician assistant (PA) who is willing to serve as the primary care clinical preceptor. Medical practice must be in primary care/family medicine.

Entry Point 2: Applicants will be placed within a designated site to complete clinical rotations.

Prerequisite Coursework:

- Human Anatomy
- Human Physiology
- Microbiology
- Medical Terminology
- Statistics
- Organic Chemistry/Biochemistry/Cellular Biology/Molecular Biology (Entry Point 2 Only)
- Psychology (Entry Point 2 Only)

Admission Preference

North Dakota residents as well as residents from the surrounding states of Montana, Minnesota, and South Dakota are given admission preference. Applicants from rural or underserved communities are also awarded preference.

Entry Point 1: Applicants are accepted from all over the United States. Preference is given to clinical sites in rural (<25,000 population) or underserved populations.

Entry Point 2: Applicants must be from North Dakota, Montana, Minnesota, or South Dakota. Applicants from outside those states will not be considered. Preference is evaluated based on a combination of residence, employment, and volunteer experience in rural or underserved communities.

Additional Requirements

1. Complete applications to CASPA and the UND School of Graduate Studies along with all supporting materials as explained at: How to Apply (https://med.und.edu/physician-assistant/how-to-apply.html).
2. Complete a preceptor profile if applying under Entry Point 1 admission criteria.
3. Complete a successful interview.
4. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.
5. Comply with the Academic and Technical Standards (https://med.und.edu/physician-assistant/standards.html) for matriculation, promotion, and graduation.
6. Complete a health screening and a criminal background check prior to matriculation.

Degree Requirements

Students seeking the Master of Physician Assistant Studies degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Physician Assistant Program.

1. Successful completion of all courses in core curriculum.
2. Completion of a written scholarly project approved by the academic advisor.
3. Written comprehensive final examination.

Required Courses:

- PA 507 Medical Human Anatomy & Radiology I 3
- PA 508 Medical Human Anatomy & Radiology II 3
- PA 510 Human Physiology & Pathophysiology I 4
- PA 511 Human Physiology & Pathophysiology II 4
- PA 516 EKG Interpretation 1
- PA 517 Pharmacology I 2
- PA 518 Pharmacology II 2
- PA 521 Diagnostic Studies I 2
- PA 522 Diagnostic Studies II 2
- PA 523 Diagnostic Studies III 2
- PA 525 Scholarly Project Development 3
- PA 540 Clinical Medicine: Primary Care I - Didactic 5
- PA 541 Clinical Medicine: Primary Care I Clinical 5
- PA 550 Clinical Medicine: Primary Care II - Didactic 5
- PA 551 Clinical Medicine: Primary Care II - Clinical 4
- PA 560 Clinical Medicine: Primary Care III - Didactic 3
- PA 561 Clinical Medicine: Primary Care III - Clinical 4
- PA 566 Professional Issues & Role Development I 2
- PA 567 Professional Issues & Role Development II 1
- PA 568 Professional Issues & Role Development III 1
- PA 569 Professional Issues & Role Development IV 1
- PA 580 Specialty Clerkship 6
- PA 581 Emergency Department Clerkship 4
- PA 582 General Surgery Clerkship 4
- PA 995 Scholarly Project 3
- PA 512 History and Physical Exam I 2
- PA 513 History and Physical Exam II 2
- PA 570 Clinical Medicine - Primary Care Clinical Continuation 7
- PA 571 Rural/Underserved Primary Care Clinical 3

Total Credits 90

Physics and Astrophysics

M.S. in Physics and Astrophysics (p. 526)
Ph.D. in Physics and Astrophysics (p. 526)
Five-Year B.S.-M.S. in Physics (p. 525)

Courses

PHYS 509. Methods of Theoretical Physics. 3 Credits.
An introduction to the mathematical methods currently used in physics.

PHYS 510. Methods of Theoretical Physics. 3 Credits.
A continuation of Physics 509 introduction to the mathematical methods currently used in physics.

PHYS 511A. Physics for Teachers I. 3 Credits.
Prerequisite: PHYS 511L.

PHYS 511B. Physics for Teachers I. 3 Credits.
Prerequisite: PHYS 511A.

PHYS 511L. Physics for Teachers I Lab. 2 Credits.
Prerequisite: Department consent.

PHYS 512A. Physics for Teachers II. 3 Credits.
Prerequisite: PHYS 512L.
PHYS 512B. Physics for Teachers II. 3 Credits.
Prerequisite: PHYS 512A.
PHYS 512L. Physics for Teachers Lab II. 2 Credits.
Prerequisites: PHYS 511L and PHYS 511B.
PHYS 513A. Physics for Teachers III. 3 Credits.
Prerequisite: PHYS 513L.
PHYS 513B. Physics for Teachers III Lab. 2 Credits.
Prerequisite: PHYS 513A.
PHYS 513L. Physics for Teachers III Lab. 2 Credits.
Prerequisites: PHYS 512L and PHYS 512B.
PHYS 520. Cosmology. 3 Credits.
Cosmology is the study of the origin, structure, and evolution of the Universe. This graduate-level course will provide an overview of recent developments in cosmology, including the Big Bang model, inflation, the cosmic microwave background, baryogenesis, the expanding universe, Hubble's constant and the distance scale, and dark energy. On demand.
PHYS 525. Galaxies. 3 Credits.
This graduate-level course will provide an overview of the formation and evolution of galaxies. Topics include: galaxy classification, formation of spheroids and disk galaxies, galactic dynamics, interstellar medium, dark matter, mass models, spiral structure formation, large-scale structure, and high redshift galaxies. On demand.
PHYS 530. Advanced Physics Laboratory. 2 Credits.
Advanced undergraduate experiments in physics, using modern techniques and instrumentation. Classic experiments leading to the current understanding of physical theory. Prerequisite: PHYS 253 or approval of instructor. F, odd years.
PHYS 531. Quantum Mechanics I. 3 Credits.
An introduction to quantum mechanics with applications to atomic structure. Prerequisite: PHYS 253. Prerequisite or Corequisite: PHYS 317 or approval of department. F, even years.

Undergraduate Courses for Graduate Credit

PHYS 402. Computers in Physics. 3 Credits.
Computer applications in physics, that may include data analysis, numerical simulation, symbolic and algebraic programming, parallel computing, computer interfacing and/or experimental physics applications. Prerequisites: PHYS 252 and knowledge of a higher-level computer programming language, or consent of instructor. On demand.
PHYS 428. Advanced Physics Laboratory. 2 Credits.
Advanced undergraduate experiments in physics, using modern techniques and instrumentation. Classic experiments leading to the current understanding of physical theory. Prerequisite: PHYS 253 or approval of instructor. F, odd years.
PHYS 431. Quantum Mechanics I. 3 Credits.
An introduction to quantum mechanics with applications to atomic structure. Prerequisite: PHYS 253. Prerequisite or Corequisite: PHYS 317 or approval of department. F, even years.

5-year B.S.-M.S. Degree Program in Physics

The program will use only the existing courses in the Department of Physics and Astrophysics, Department of Mathematics, and Department of Chemistry.

The program course requirements include the following courses:

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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>PHYS 251</td>
<td>University Physics I</td>
<td>4</td>
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<tr>
<td>PHYS 252</td>
<td>University Physics II</td>
<td>4</td>
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<tr>
<td>PHYS 253</td>
<td>University Physics III</td>
<td>4</td>
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<tr>
<td>PHYS 317</td>
<td>Mechanics I</td>
<td>3</td>
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<tr>
<td>PHYS 318</td>
<td>Mechanics II</td>
<td>3</td>
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<tr>
<td>PHYS 324</td>
<td>Thermal Physics</td>
<td>3</td>
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<tr>
<td>PHYS 325</td>
<td>Optics</td>
<td>3</td>
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<tr>
<td>PHYS 325L</td>
<td>Optics Laboratory</td>
<td>1</td>
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<tr>
<td>PHYS 327</td>
<td>Electricity and Magnetism I</td>
<td>3</td>
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<tr>
<td>PHYS 328</td>
<td>Electricity and Magnetism II</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 415</td>
<td>Undergraduate Research Experience</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 428</td>
<td>Advanced Physics Laboratory</td>
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<tr>
<td>PHYS 431</td>
<td>Quantum Mechanics I</td>
<td>3</td>
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<tr>
<td>PHYS 432</td>
<td>Quantum Mechanics II</td>
<td>3</td>
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<tr>
<td>PHYS 509</td>
<td>Methods of Theoretical Physics</td>
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</table>
Doctor of Philosophy in Physics and Astrophysics

Admission Requirements

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

Applicants who are seeking admission to School of Graduate Studies must meet all of the minimum general School of Graduate Studies admission requirements identified in the graduate catalog. In addition, prospective students must fulfill the requirements for admission to the graduate program in Physics and Astrophysics.

1. Successful completion of a master’s degree (Some programs permit bypassing the master’s degree and allow for direct admission to the Ph.D. degree. Check specific department requirements for admission.)
2. An overall GPA of 3.0 for all graduate work.
3. Completed all undergraduate preparation.
4. Presentation of scores on the GRE General Test and advanced physics test is recommended.
5. Be recommended for doctoral work by the department.

Degree Requirements

Students seeking the Doctor of Philosophy degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Physics and Astrophysics Department.

The degree is a research degree and is conferred only in recognition of high achievement in independent scientific research and scholarship.

1. Completion of 90 semester credits beyond the baccalaureate degree.
2. Maintenance of at least a 3.0 GPA for all classes completed as a graduate.
3. With approval of a student’s Faculty Advisory Committee, up to one-half of the work beyond a master’s degree (maximum of 30 semester credit hours) may be transferred from another institution that offers post-master’s degrees in the discipline.
4. In addition to PHYS 590 Research, the coursework will amount to approximately 36 hours.
5. Completion of a regular core of courses which includes:

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<thead>
<tr>
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<th>Credits</th>
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<tbody>
<tr>
<td>PHYS 509</td>
<td>Methods of Theoretical Physics</td>
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<tr>
<td>PHYS 510</td>
<td>Methods of Theoretical Physics</td>
<td>3</td>
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<tr>
<td>PHYS 539</td>
<td>Quantum Mechanics</td>
<td>3</td>
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<tr>
<td>PHYS 540</td>
<td>Quantum Mechanics</td>
<td>3</td>
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<tr>
<td>PHYS 541</td>
<td>Theory Electricity Magnetism</td>
<td>3</td>
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<tr>
<td>PHYS 542</td>
<td>Theory Electricity and Magnetism</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 543</td>
<td>Statistical Physics</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 545</td>
<td>Analytical Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 549</td>
<td>Seminar</td>
<td>1</td>
</tr>
</tbody>
</table>

6. Completion of several specialized graduate level courses in physics in order to obtain the in-depth training essential for the development of their research interest.
7. Completion of at least nine semester hours of graduate work, (400 level or above) in a single related field.
8. After successful completion of the first two semesters of coursework, students who entered the program with a bachelor’s degree will take a written qualifying examination, which covers undergraduate and first-year graduate level courses. Students with a master’s degree will take this examination in the second semester of enrollment.
9. A student who fails to perform satisfactorily in this examination may be re-examined after waiting one semester. In general, no student will be allowed to take the qualifying examination more than twice.
10. No student may proceed formally toward the Ph.D. degree until this examination has been passed.
11. Written doctoral comprehensive examination in physics will normally be taken in the fifth semester of graduate enrollment. This must be completed before advancement to candidacy is granted.
12. Candidates for the Ph.D. must complete a research investigation. Upon satisfactory completion of the research investigation, the student is required to prepare a dissertation covering the research.

At the final oral examination, the candidate presents and defends the dissertation.

Master of Science in Physics and Astrophysics

Admission Requirements

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. A four-year bachelor’s degree from a recognized college or university.
2. A cumulative Grade Point Average (GPA) of at least 2.75 for all undergraduate work (2.5 for M. Engr.) or a GPA of at least 3.0 for the junior and senior year of undergraduate work (based on a 4.0 scale).
3. Completed a minimum of 21 semester credits of undergraduate physics, plus mathematics through differential equations or the equivalent.
4. Coursework should include intermediate courses in mechanics, electricity and magnetism, optics, thermal physics, and modern quantum physics. Adequate preparation in general chemistry is also necessary.
5. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.
6. An applicant without satisfactory undergraduate training may be admitted to the program, but will be required to remove deficiencies by completing the necessary undergraduate courses without receiving graduate credit for them.
7. Ph.D. applicants are encouraged to submit the Graduate Record Examination scores for the general test and advanced physics test.

Degree Requirements

Students seeking the Master of Science degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Physics and Astrophysics Department.

The program is designed to provide the student with basic physics courses at the graduate level and an introduction to research.

1. Minimum of 30 semester credits in a major field, including the credits granted for the thesis and the research leading to the thesis.
2. At least one-half of the credits must be at or above the 500-level.
3. A maximum of one-fourth (usually 8-9 semester credits) of the credit hours required for the degree may be transferred from another institution.
4. Complete the following courses:

- PHYS 509  Methods of Theoretical Physics  3
- PHYS 539  Quantum Mechanics  3
- PHYS 541  Theory Electricity Magnetism  3
- PHYS 545  Analytical Mechanics  3

5. Complete six additional hours from the following:

- PHYS 510  Methods of Theoretical Physics  3
- PHYS 540  Quantum Mechanics  3
- PHYS 542  Theory of Electricity and Magnetism  3

6. Complete research project and PHYS 998 Thesis (4-9 credits).

**Psychology**

M.A. in Psychology (p. 530)

Ph.D. in Clinical Psychology (p. 528)

M.S. in Forensic Psychology (p. 531)

M.A. in Forensic Psychology (p. 530)

Ph.D. in General/Experimental Psychology (p. 529)

Graduate Minor in Psychology (p. 529)

Certificate in Behavioral Data Analytics (p. 529)

Certificate in Cyber Security and Behavior (p. 529)

**Courses**

**PSYC 501. Psychological Foundations Educ. 3 Credits.**
A study of the learning process with secondary emphasis on how the learning process is affected by individual differences, growth, development, and personality. Prerequisite: Graduate standing in Psychology or Education.

**PSYC 505. History of Psychology. 3 Credits.**
Historical development of modern psychology with an emphasis on experimental and systematic phases of early psychological thought, on important issues during the growth of psychology, and on current trends. Prerequisite: Graduate standing in Psychology or Counseling.

**PSYC 520. Foundations of Forensic Psychology. 3 Credits.**
Prerequisite: Graduate status in Psychology or permission of instructor.

**PSYC 521. Diversity Psychology. 3 Credits.**
The purpose of this course is to provide students with an advanced consideration of the major issues in the study of diversity as it applies to the field of psychology. Prerequisite: Graduate status in Psychology or permission of instructor.

**PSYC 522. Human Factors in Cyber Security. 3 Credits.**
This course examines the critical role human behavior plays in maintaining or conversely endangering cyber security. The science of human attention, perception, learning, and cognition is applied to the problem of maintaining secure cyber systems. On demand.

**PSYC 523. Forensic Assessment. 3 Credits.**
This course is designed to provide students with 1) a review of assessment measures used in forensic assessment 2) an in-depth study of ethical and professional issues in forensic assessment, and 3) training in writing assessment reports. Prerequisite: Graduate status in Psychology or permission of instructor. SS, even years.

**PSYC 524. Psychology and Law. 3 Credits.**
An in-depth examination of the interaction between the disciplines of psychology and law. The course will look at how psychological research and theories are applied to contemporary legal issues. Prerequisite: Graduate status in Psychology or permission of instructor.

**PSYC 525. Insider Threat Analysis. 3 Credits.**
This course provides an in-depth examination and analysis of what is referred to as insider threat. Insider threat is when a current or former employee or other person that has “insider access” such as contractors, outsourcers, and even cloud-computing vendors compromises the security of a cyber-system or application either intentionally or unintentionally. Insider threats are often considered the greatest cyber security risks. On demand.

**PSYC 526. Psychological Profiling and Criminal Behavior. 3 Credits.**
Prerequisite: Graduate status in Psychology or permission of instructor.

**PSYC 528. Forensic Psychology Capstone. 3 Credits.**
The culminating course for the Forensic Psychology Master of Arts program. Students are provided with the opportunity to synthesize knowledge and skills acquired throughout their program. Prerequisites: Graduate status in MA Forensic Psychology, PSYC 997, and expected graduation of the summer semester the course is taken.

**PSYC 533. Theories of Learning. 3 Credits.**
Examination of the evidences in support of the various systematic theories of learning. Prerequisite: Graduate standing in Counseling or Psychology or consent of instructor.

**PSYC 537. Physiology of Behavior and Psychophysiological Measurement. 3 Credits.**
This is an advanced graduate course covering major topics of physiological psychology while also introducing measurement techniques traditionally used in psychophysiological research. While physiology and anatomy of the central and peripheral nervous systems will be reviewed in this course, students are expected to have basic knowledge of neuroscience, behavioral science, and research methodology. Experiential learning activities will focus on the demonstration and practice of psychophysiological measurement and recording techniques, data analysis, and interpretation. Prerequisite: Graduate standing in Psychology or permission of instructor.

**PSYC 539. Cognitive Psychology. 3 Credits.**
An in-depth analysis and discussion (including laboratory work) of topics covering issues related to memory, attention, problem solving, comprehension, and thinking. Prerequisite: Graduate standing in Psychology or permission of instructor.

**PSYC 540. Foundations of Behavioral Data Analytics. 3 Credits.**
This course covers the process of inspecting, cleansing, transforming, and modeling quantitative data with the goal of discovering useful information, suggesting conclusions, and supporting decision-making. Behavioral data analytics has multiple facets and approaches, encompassing diverse techniques under a variety of names. In this course, we will cover data mining focused on modeling and knowledge discovery for predictive rather than purely descriptive purposes. Techniques for integrating data and for visualizing data will also be explored. On demand.

**PSYC 541. Advanced Univariate Statistics. 3 Credits.**
Theory of univariate statistics; application to quantitative data in psychology. Prerequisites: Graduate standing, college algebra, and elementary statistics.

**PSYC 542. Multivariate Statistics for Psychology. 3 Credits.**
The appropriate use and interpretation of multivariate data analytic techniques in psychology. Prerequisites: Graduate standing and PSYC 541.

**PSYC 543. Experimental Design. 3 Credits.**
Application of statistics and probability theory to the design and analysis of experiments. Prerequisite: PSYC 541 or consent of instructor.

**PSYC 551. Advanced Developmental Psych. 3 Credits.**
In-depth analysis and integration of theories and theorists relevant for current issues in lifespan developmental psychology. Prerequisite: Graduate status in Psychology or permission of instructor.

**PSYC 560. Advanced Social Psychology. 3 Credits.**
In-depth examination of the theoretical and empirical literature in social psychology focusing on attitudes, stereotyping and prejudice, interpersonal relationships, social cognition, personality and the self, and group behavior. Also includes additional course readings and written work beyond the requirements for Psychology 460. Prerequisite: Graduate status in Psychology or permission of instructor.

**PSYC 565. Multicultural Psychology. 3 Credits.**
Examinations of cross-cultural work in psychology with attention to race, ethnicity, and culture. Special emphasis is given to research, training, and treatment issues with minority groups, including the American Indian and other cultural groups. Prerequisite: Graduate status in Psychology.
PSYC 570. Clinical Assessment I: Basic Issues in Clinical Assessment. 4 Credits.
Provides the conceptual and practical frameworks upon which to build expertise in the assessment and prediction of human behavior in relation to intellectual indices and interviewing skills. Serves as a graduate foundation to explore, analyze, and discuss basic and applied issues relevant to psychological testing, the administration and interpretation of widely-used intellectual assessment instruments, and the opportunity to develop structured clinical interviewing techniques. Prerequisite: Clinical Psychology graduate status or consent of instructor.

PSYC 571. Clinical Assessment II: Advanced Issues in Clinical Assessment. 4 Credits.
Provides the conceptual and practical frameworks upon which to build expertise in the assessment and prediction of human behavior in relation to personality assessment, behavioral assessment, neuropsychological assessment, and the assessment of high incidence behavioral disorders. Skills in report writing and case conference presentation will also be developed. Prerequisites: PSYC 570 and/or consent of instructor.

PSYC 572. Community Psychology. 3 Credits.
Theories and practicum in community mental health consultation. Credits in PSYC 587 may be earned in conjunction with this course. Prerequisites: PSYC 571, PSYC 573, and graduate standing in Psychology.

PSYC 573. Theories of Psychotherapy. 3 Credits.
Theory and practicum in individual psychotherapy, with emphasis on systematic comparison of major theoretical viewpoints. Prerequisite or Corequisite: PSYC 571 and/or consent of instructor.

PSYC 574. Advanced Therapeutic Interventions. 3 Credits.
An in-depth study of the key issues of psychotherapy research with a focus on critical evaluation of the psychotherapy research literature and the development of knowledge of empirically supported approaches to psychotherapy with specific problems. Prerequisite: PSYC 573 or permission of instructor.

PSYC 575. Behavior Pathology. 3 Credits.
A survey of various forms of behavior pathology with emphasis upon current research and theories relating to pathology. Prerequisite: Graduate standing in psychology or instructor permission. F.

PSYC 576. Child Psychopathology and Treatment. 3 Credits.
An overview of child and developmental psychopathology including discussion of pertinent treatments for disorders such as conduct disorders, attention-deficit, substance abuse, and developmental disabilities. Prerequisites: PSYC 570 and PSYC 575, or instructor permission.

PSYC 579. Professional Issues and Ethics in Psychology. 3 Credits.
An exploration of ethical issues pertinent to the science and practice of psychology and discussion of current professional issues facing psychology. Prerequisite: Graduate standing in Psychology or permission of instructor.

PSYC 580. Clinical Practice. 1-3 Credits.
Supervised individual practice in techniques of individual psychotherapy, marital therapy, counseling, and guidance of parents and children, administration of psychological examinations, behavior modification, community mental health procedures, consultation, and other professional practices of the clinical psychologist. Prerequisites: PSYC 571, graduate standing in Psychology, and consent of instructor. Repeatable. S/U grading.

PSYC 587. Supervised Field Work. 1-3 Credits.
Used primarily for individualized field placement so that the student may acquire practicum experiences in clinical settings, community psychology, and group methods. Prerequisites: Graduate standing in Psychology or consent of instructor. Repeatable. S/U grading.

PSYC 593. Readings in Psychology. 1-3 Credits.
Prerequisites: Advanced standing in Psychology and consent of instructor. Repeatable.

PSYC 594. Special Topics in Psychology. 1-3 Credits.
Topical courses in Psychology organized on a semester-by-semester basis. Prerequisites: Graduate standing in Psychology or permission of instructor. Repeatable. On demand.

PSYC 595. Seminar in Psychology. 1-3 Credits.
Prerequisites: Consent of instructor.

PSYC 596. Individual Research. 1-6 Credits.
Repeatable.

PSYC 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

PSYC 997. Independent Study. 3 Credits.
The independent study is designed to require the student independently to investigate a topic related to the field of forensic psychology. The study need not be an original contribution to knowledge but may be a presentation, analysis, and discussion of information and ideas already in the literature. The requirement for independent study is to ensure that a student can investigate a topic and organize a scholarly report on the investigation. Prerequisite: Graduate status in the Master of Arts. F, S, SS.

PSYC 998. Thesis. 1-9 Credits.
Repeatable to 9 credits.

PSYC 999. Dissertation. 1-18 Credits.
Repeatable to 18 credits.

Doctor of Philosophy in Clinical Psychology

Admission Requirements

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. A four-year bachelor’s degree from a recognized college or university. For U.S. degrees, accreditation must be by one of the six regional accrediting associations.
2. Eighteen (18) hours of undergraduate work in psychology including a course in General Psychology, Developmental, Abnormal, Statistics, and Experimental Psychology.
3. A cumulative Grade Point Average (GPA) of at least 3.2 for all undergraduate work.
4. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.
5. A year of biological science (biology, physiology, etc.).
6. A semester of college algebra.
7. General background in other social and natural sciences also recommended.
8. Graduate Record Examination—30th percentile or higher on Verbal, Quantitative, and Analytic Writing.

Degree Requirements

Students seeking the Doctor of Philosophy degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Psychology Department.

1. Minimum of 60 credit hours beyond 30 credits from Masters degree work is required for the Ph.D. (minimum of 90 credit hours total).
2. Maintenance of at least a 3.0 GPA for all classes completed as a graduate student.
3. Completion of “Scholarly Tool” coursework to develop skills in research design including:
   - PSYC 541 Advanced Univariate Statistics 3
   - PSYC 542 Multivariate Statistics for Psychology 3
   - PSYC 543 Experimental Design 3
4. Completion of an empirical dissertation;
5. Graduate students in the clinical psychology Ph.D. program are required to meet a number of eligibility criteria to take comprehensive exams and establish candidacy for the Ph.D. degree. An assessment will be conducted after the student successfully completes all of the requirements for the Master of Science degree in general psychology. To remain in the Ph.D. program and proceed on to comprehensive exams, practicum assignments, dissertation research, and remaining coursework, the student must have:
   a. earned a cumulative graduate grade point average of at least 3.5;
   b. completed his or her M.S. degree within three years of enrollment;
   c. gained the approval of a majority of the core and associated faculty of the clinical psychology doctoral program.

Students failing to meet one or more of these requirements will be terminated from the Ph.D. program in clinical psychology.
6. Completion of the comprehensive examination for the Ph.D. in Clinical Psychology.

7. Completion of the following for the Ph.D. in Clinical Psychology:
   - One calendar year of full-time internship (usually during the fifth year) 3

**Practicum experience which includes**
- PSYC 580 Clinical Practice 8
- PSYC 587 Supervised Field Work 13

**Clinical coursework**
- PSYC 570 Clinical Assessment I: Basic Issues in Clinical Assessment 4
- PSYC 571 Clinical Assessment II: Advanced Issues in Clinical Assessment 4
- PSYC 573 Theories of Psychotherapy 3
- PSYC 574 Advanced Therapeutic Interventions 3
- PSYC 575 Behavior Pathology 3
- PSYC 579 Professional Issues and Ethics in Psychology 3
- PSYC 594 Special Topics in Psychology 2

**Foundation coursework in**
- History of Psychology
  - PSYC 505 History of Psychology 3
- Social Bases of Behavior
  - PSYC 560 Advanced Social Psychology 3
- Biological Bases of Behavior
  - PSYC 537 Physiology of Behavior and Psychophysiological Measurement 3
- Cognitive/affective bases of behavior
  - PSYC 539 Cognitive Psychology 3
- Developmental Basis of Behavior
  - PSYC 576 Child Psychopathology and Treatment 3
  - or PSYC 551 Advanced Developmental Psych 3
- Diversity Elective
  - PSYC 521 Diversity Psychology 3
- Research Credits
  - Master’s Thesis 6
  - Dissertation 13

**Total Credits** 83

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**Doctor of Philosophy in General/Experimental Psychology**

**Admission Requirements**
The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. A four-year bachelor’s degree from a recognized college or university. For U.S. degrees, accreditation must be by one of the six regional accrediting associations.
2. A cumulative Grade Point Average (GPA) of at least 3.20 for all undergraduate work.
3. Graduate Record Examination—30th percentile or higher on Verbal, Quantitative, and Analytic Writing.
4. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

Although not required, applicants are recommended to have a year of biological science (biology, physiology, etc.), a semester of college algebra, and a general background in other social and natural sciences.

**Degree Requirements**
Students seeking the Doctor of Philosophy degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Psychology Department.

1. Minimum of 60 credit hours beyond 30 credits from Masters degree work is required for the Ph.D. (minimum of 90 credit hours total).
2. Maintenance of at least a 3.0 GPA for all classes completed as a graduate student.
3. Completion of “Scholarly Tool” coursework to develop skills in research design including:
   - PSYC 541 Advanced Univariate Statistics 3
   - PSYC 542 Multivariate Statistics for Psychology 3
   - PSYC 543 Experimental Design 3

5. Graduate students in the general-experimental psychology Ph.D. program are required to meet a number of eligibility criteria to take comprehensive exams and establish candidacy for the Ph.D. degree. An assessment will be conducted after the student successfully completes all of the requirements for the Master of Science degree in general psychology. To remain in the Ph.D. program and proceed on to comprehensive exams, dissertation research, and remaining coursework, the student must have a.
   - earned a cumulative graduate grade point average of at least 3.5;
   - completed his or her M.S. degree within three years of enrollment;
   - gained the approval of a majority of the core and associated faculty of the General/Experimental psychology doctoral program.
   Students failing to meet one or more of these requirements will be terminated from the Ph.D. program in general-experimental psychology.
6. Completion of the comprehensive examination for the Ph.D. in Experimental Psychology.

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**Graduate Certificate in Behavioral Data Analytics**

**Admission Requirements**
Admission to the School of Graduate Studies. Students admitted to the certificate program are required to complete the three required courses below for a total of at least 9 credits.

**Certificate Requirements**
- PSYC 540 Foundations of Behavioral Data Analytics 3
- PSYC 541 Advanced Univariate Statistics 3
- PSYC 542 Multivariate Statistics for Psychology 3

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**Graduate Certificate in Cyber Security and Behavior**

**Admission Requirements**
Admission to the School of Graduate Studies. Students admitted to the certificate program are required to complete the two required courses below and one elective for a total of at least 9 credits.

**Certificate Requirements**
Required courses:
- PSYC 522 Human Factors in Cyber Security 3
- PSYC 525 Insider Threat Analysis 3

Approved elective from the following:
- PSYC 433 Psychology of Learning 4
- PSYC 436 Perception 4
- PSYC 533 Theories of Learning 3
- PSYC 539 Cognitive Psychology 3

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**Graduate Minor in Psychology**

Graduate students taking major work in other departments and graduate minor work in psychology for a master’s degree should have the equivalent
of an undergraduate minor in psychology with the following specific courses: PSYC 111 Introduction to Psychology, PSYC 250 Developmental Psychology, PSYC 270 Abnormal Psychology (or the equivalent). Any of the psychology courses, which carry graduate credit, are acceptable for the graduate minor.

Graduate students taking major work in another department and minor work in psychology for a doctoral degree, in addition to having the undergraduate preparation noted in the paragraph above, must also have completed a course in statistics and an undergraduate laboratory course in Experimental Psychology. No specific courses are required for the graduate minor except that all credits for the minor must be 500-level credits.

Master of Arts in Forensic Psychology

Admission Requirements

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. A baccalaureate degree from an accredited college or university with a behavioral or social science major allied with psychology, i.e., psychology, criminal justice, sociology, counseling, or social work.
2. A cumulative undergraduate grade point average (GPA) of 3.0 or above, or a graduate degree GPA of 3.50.
3. Submission of a curriculum vitae and a personal statement describing:
   a. academic and professional accomplishments;
   b. reasons for pursuing a graduate degree in Forensic Psychology; and
   c. any additional information the applicant would like the admission committee to know.
4. Submission of three letters of recommendation from those who can comment on your academic abilities or ability to understand complex issues and think critically, e.g., former faculty member or work supervisor.
5. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

Degree Requirements

Students seeking the Master of Arts degree in Forensic Psychology include a minimum of 30 credits of coursework:

Required Core Courses (21 credits):

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYC 524</td>
<td>Psychology and Law</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 528</td>
<td>Forensic Psychology Capstone (summer, immediately prior to graduation, 2 week course, one week of which is on campus)</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 541</td>
<td>Advanced Univariate Statistics</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 560</td>
<td>Advanced Social Psychology</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 575</td>
<td>Behavior Pathology</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 593</td>
<td>Readings in Psychology</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 997</td>
<td>Independent Study (research or practicum experience possible)</td>
<td>3</td>
</tr>
</tbody>
</table>

Elective Courses (9 credits):

Choose 3 of the following: 9

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYC 539</td>
<td>Cognitive Psychology</td>
</tr>
<tr>
<td>PSYC 587</td>
<td>Supervised Field Work</td>
</tr>
<tr>
<td>PSYC 594</td>
<td>Special Topics in Psychology (can be repeated for credit for up to all 9 credits of elective courses; e.g., Eyewitness Testimony; Psychology in the Courtroom; Interrogation)</td>
</tr>
</tbody>
</table>

Total Credits 30

Note: The student’s Advisory Committee will also consider other graduate classes as appropriate electives on a case-by-case basis. Students who have a strong psychology background may, after review by the Committee, be permitted to substitute an appropriate forensic psychology graduate elective for a required program course. A maximum of eight graduate credits may be transferred from another institution.

Master of Arts in Psychology

Admission Requirements

1. Applicants may be considered either as high school students or as undergraduates. High achieving high school students (GPA of at least 3.5/4.0 and an ACT score of 25 or higher) will initially be considered for "identified" status and become eligible for formal admission when they meet the same criteria that undergraduates must meet for admission. Admission is a competitive process and meeting the following minimum eligibility requirements doesn't guarantee admission.
   a. All graduate admissions eligibility requirements (see academic catalog for the Accelerated Bachelor's/Master's (ABM) 5 Year Degree Program).
   b. A minimum cumulative Grade Point Average (GPA) of at least 3.20 (based on A= 4.00) for all undergraduate work.
   c. Completion of Introduction to Statistics (PSYC 241), Research Methods in Psychology (PSYC 303), and Advanced Research Methods (PSYC 304), with a minimum grade of B in each course.
   d. Applicants who are undergraduates must have completed at least 1 credit of either Independent Research (PSYC 294) or Advanced Individual Research (PSYC 494) and must have earned a minimum grade of B for each credit.

Degree Requirements

Students seeking the Master of Arts degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Department of Psychology. The exact requirements set forth by the Department of Psychology include that students complete, as appropriate, the requirements for one of the two concentrations listed below.

Concentration A: Behavioral Data Analytics

- A minimum of 30 graduate credits.
- Nine (9) of the 30 credits must satisfy the requirements for the Graduate Certificate in Behavioral Data Analytics:
  - PSYC 540 Foundations of Behavioral Data Analytics 3
  - PSYC 541 Advanced Univariate Statistics 3
  - PSYC 542 Multivariate Statistics for Psychology 3

- Eighteen (18) of the 30 credits are elective course credits at the 500-level or above which are approved by the respective advisory committee and documented in the Program of Study. A minimum of 12 credits must consist of course credits offered by the Department of Psychology.
- Three (3) of the 30 credits must for an Independent Study (PSYC 997). To successfully complete these credits, students must prepare a written independent research report and deliver an oral presentation of their results to the advisor and interested faculty.

Concentration B: Forensic Psychology

- A minimum of 30 graduate credits.
- Eighteen (18) of the 30 credits must include:
  - PSYC 523 Forensic Assessment 3
  - PSYC 524 Psychology and Law 3
  - PSYC 540 Foundations of Behavioral Data Analytics 3
  - PSYC 541 Advanced Univariate Statistics 3
  - PSYC 543 Experimental Design 3
  - PSYC 575 Behavior Pathology 3

- Three (3) of the 30 credits must for an Independent Study (PSYC 997). To successfully complete these credits, students must prepare a written
independent research report and deliver an oral presentation of their results to the advisor and interested faculty.

• Choose three of the following Electives:

1. PSYC 539 Cognitive Psychology 3
PSYC 560 Advanced Social Psychology 3
PSYC 587 Supervised Field Work 1-3
PSYC 594 Special Topics in Psychology 1-3
CJ 515 Human Nature and Crime 3
CJ 535 Seminar in Juvenile Justice 3
CJ 565 Victimization 3

Master of Science in Forensic Psychology

Admission Requirements - Accelerated Bachelor's/Master's (ABM) 5 year Degree

The Accelerated Bachelor's/Master of Science degree program allows exceptional high school students and undergraduate students at UND an opportunity to complete the requirements for both the bachelor's and master's degrees at an accelerated pace. High achieving high school students (GPA of at least 3.5/4.0 and an ACT score of 25 or higher) will initially be considered for "identified" status and become eligible for formal admission when they meet the same criteria that undergraduates must meet for admission. Admission is a competitive process and meeting the following minimum eligibility requirements doesn't guarantee admission.

1. Applicants must meet the School of Graduate Studies' current minimum general admission requirements for the Accelerated Bachelor's/Master's (ABM) 5 Year Degree Program as published in the graduate catalog.
2. A minimum cumulative Grade Point Average (GPA) of at least 3.20 (based on A= 4.00) for all undergraduate work.
3. Completion of Introduction to Statistics (PSYC 241), Research Methods in Psychology (PSYC 303), and Advanced Research Methods (PSYC 304), with a minimum grade of B in each course.
4. Applicants who are undergraduates must have completed at least 1 credit of Independent Research (PSYC 294) or Advanced Individual Research (PSYC 494) and must have earned a minimum grade of B for each credit.

Admission Requirements - Traditional 2-year Master of Science Degree

The applicant must meet the School of Graduate Studies' current minimum general admission requirements as published in the graduate catalog.

1. Applicants must have a baccalaureate degree from an accredited college or university with a behavioral or social science major allied with psychology, e.g., psychology, criminal justice, sociology, counseling, and social work.
2. Applicants must have a cumulative undergraduate GPA of 3.2 or above or a graduate degree GPA of 3.5.
3. Applicants must also submit GRE scores, with Verbal, Quantitative, and Analytic Writing scores meeting or exceeding the 30th percentile. Applicants not meeting these standards may be admitted on a provisional basis with continued enrollment contingent on successful performance in the program.
4. A personal statement discussing:
   a. academic and professional accomplishments;
   b. reasons for pursuing a graduate degree in Forensic Psychology;
   c. research interests; and
   d. any additional information the applicant would like the admission committee to know.
5. A curriculum vita summarizing relevant experiences including but not limited to academic course work and work, volunteer, and research activities.
6. Three letters of recommendation from those who can comment on the applicant's academic abilities are also required. Consideration will be given for experience working in forensic areas or participating in research as an assistant prior to the program application.
7. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

Degree Requirements

Students seeking the Master of Science degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Forensic Psychology program.

Students in the M.S. Forensic Psychology Program at UND are required to complete 30 credits. This includes 18 credits of required coursework, 6 to 9 credits of elective courses, and either 6 credit hours of thesis credit (thesis option) or 3 credits of Independent Study (non-thesis option). The Forensic Psychology program does not have a comprehensive examination.

• Requirements for Matriculating in the Thesis Track
1. Overall GPA = 3.5
2. Permission of Advisor and Program Director

Required Courses (18 Credits)

PSYC 523 Forensic Assessment 3
PSYC 524 Psychology and Law 3
PSYC 541 Advanced Univariate Statistics 3
PSYC 542 Multivariate Statistics for Psychology 3
PSYC 543 Experimental Design 3
PSYC 575 Behavior Pathology 3

Elective Courses (6-9 credits):

Choose two or three of the following: 6-9

PSYC 539 Cognitive Psychology
PSYC 560 Advanced Social Psychology
PSYC 587 Supervised Field Work
PSYC 594 Special Topics in Psychology
PSYC 594 Special Topics in Psychology
PSYC 594 Special Topics in Psychology
CJ 515 Human Nature and Crime
CJ 535 Seminar in Juvenile Justice
CJ 565 Victimization

Thesis Option (6 Credits)

PSYC 998 Thesis 1-9

Non-Thesis Option (3 Credits)

PSYC 997 Independent Study 3

Note: The student’s Advisory Committee will also consider other graduate classes as appropriate electives on a case-by-case basis. Students who have a strong psychology undergraduate background may, after review by the Committee, be permitted to substitute an appropriate forensic psychology class.

Public Affairs

Master of Public Administration (p. 535)
Combined M.P.A./J.D. (p. 535)
Combined B.S.P.A./M.P.A (p. 533)
Certificate in Health Administration (p. 534)
Certificate in Public Administration (p. 534)
Certificate in Policy Analysis (p. 534)
Certificate in Social Entrepreneurship (p. 535)
Courses
POLS 500. Research Methods. 3 Credits.
A statistics course or consent of instructor. This course will first focus on various approaches to analyzing political phenomena with the goal of developing students’ ability to think analytically and to distinguish between empirical and normative analysis. The course will then introduce techniques of empirical research including research design, measurement, data gathering, and data analysis. Prerequisite: A statistics course or consent of instructor.

POLS 501. Political and Public Policy Analysis. 3 Credits.
This course focuses on the use of empirical data both to develop empirical theory and to make policy choices. Topics to be discussed include hypothesis testing, public choice, and policy evaluation. Students will be required to complete an original research project. Prerequisite: POLS 500 or consent of instructor.

POLS 502. Problems in State and Local Governments. 3 Credits.
Directed in-depth inquiry into contemporary structural and policy problems of state and local governments. During the course, each student will prepare a research paper relevant to a current problem suitable for publication and distribution to an identifiable body of public officials and citizens for problem-solving purposes. On demand.

POLS 503. Government and Business. 3 Credits.
This course is designed to make students aware of the interrelationship of business and government in our society and the importance of this interrelationship in an era of globalization. It introduces public and business administration students to the role of government in advancing, as well as regulating, business. Further it discusses ways that business can and does influence government decisions. It also looks at the ethical responsibilities of business and government in our society. A component of the course involves travel to Washington, D.C. to meet with political officials, e.g., the Congressional delegation; Legislative staff; government regulatory agencies, e.g., the Federal Communications Commission; government advocacy agencies, e.g., Department of Commerce; and national and international business representatives, e.g., Cargill.

POLS 508. Legislative and Executive Processes. 3 Credits.
Description, analysis, and evaluation of the structures, processes, procedures, and positions of the legislative and executive offices in government. On demand.

POLS 531. Foundations of Public Administration. 3 Credits.
An extensive overview of Public Administration stressing the basic concepts and trends in the discipline as well as the classic scholars. F.

POLS 532. Public Policy. 3 Credits.
A discussion of the initiation, formulation, adoption, implementation, and evaluation of American public policy. Various policy areas such as agriculture, education, environment, and welfare will be analyzed.

POLS 533. Administrative Ethics in the Public Sector. 3 Credits.
This course examines the challenges faced by public administrators in establishing personal standards of conduct in the administrative environment. Issues such as moral versus political accountability, social justice and whistle blowing are among the topics that will be explored in this course.

POLS 535. Public Organizations. 3 Credits.
Description and analysis of bureaucratic organizations with particular emphasis on concepts and characteristics common to public bureaucracies.

POLS 536. Public Personnel Administration. 3 Credits.
This course is designed to help managers in all positions of an organization to understand the fundamental nature of public personnel administration, also known as human resource management. Topics to be covered include basic functions such as position classification, wage and salary administration, and performance appraisal. Attention will be given to contemporary issues such as sexual harassment, affirmative action, privacy, and unionization.

POLS 537. Program Evaluation. 3 Credits.
This course introduces students to the theories and concepts of program evaluation research to analyzing the effectiveness of public programs and enhance decision-making. Students will be introduced to the principal theories and techniques in the field and develop understanding of the benefits and trade-offs of each. In addition, students will develop practical skills through the development of a detailed evaluation design and plan for implementation. S.

POLS 538. Public Budgeting and Financial Administration. 3 Credits.
This course will encompass the normative and descriptive budgetary questions in public administration. Orthodox, prevailing, and alternative budget theories are presented in generalized and applied settings.

POLS 539. Administrative Law. 3 Credits.
Study of the legal dimension of public administration. Study of requirements for rule making and adjudication and of judicial review of administrative decisions.

POLS 551. Health Administration and Organization. 3 Credits.
The evolution of health systems and their organizational challenges of administration from human resources to management in times of scarce resources are explored. Specific attention is devoted to Financial Management, Managerial and Fund Accounting, Medicare, Medicaid, Fiscal Intermediaries and Managed Care, and Organizations in Decline.

POLS 552. Health Policy. 3 Credits.
This course examines historic and contemporary trends in health care delivery in the United States. Emphasis is placed on addressing health care cost-containment issues; access to health care and, recent efforts to invoke broadly based systemic reforms of the U.S. health care system.

POLS 561. Creation and Management of Social Enterprises. 3 Credits.
This course provides an overview of social entrepreneurship and social enterprises, including nonprofit. The course covers methods and techniques of social entrepreneurship, including organizational strategy, design, management, strategic planning, and leadership for social enterprises; legal foundations of social enterprises in the U.S.; and methods of social enterprise program evaluation. F. odd years.

POLS 562. Political Advocacy and Social Entrepreneurship. 3 Credits.
This course examines the use of social enterprises, including nonprofit, to achieve political, economic, and social change. Course coverage includes the use of social enterprises as vehicles for social transformation, development and execution of advocacy campaigns for social enterprises, the role of social enterprises within democracies, and the potential for social enterprises to address and overcome problems of collective action. S. even years.

POLS 570. MPA Capstone. 3 Credits.
The MPA Capstone is a case-based class that requires students to apply what they have learned in the program and to bring this knowledge to bear on analyzing and finding solutions to real problems. Aspects of the cases and case-related activities will map to each of the NASPAA universal competencies as well as to select UND MPA mission-supported skills and competencies. Students must complete the course with an earned grade of B or better; may be repeated once with approval of MPA Program Director if student received a grade of C, D or F for the course. Prerequisites: POLS 500, 501, 531, 532, or instructor consent. Repeatable to 3 credits. S.

POLS 580. Administrative Internship. 1-3 Credits.
Prior approval of instructor required before enrollment. Students are employed on full-time or part-time basis in on-the-job learning situations in federal, state, or local government. Students are required to make an analytical report on some facet of their work. Prerequisite: Instructor consent.

POLS 591. Readings in Political Science and Public Administration. 1-3 Credits.
Prior approval of instructor required before enrollment. Selected readings with oral and written reports. Prerequisite: Prior approval of instructor required before enrollment. Repeatable to 3 credits.

POLS 593. Problems in Political Science and Public Administration. 1-3 Credits.
Prior approval of instructor required before enrollment. Students study special topics under the direction and supervision of a member of the staff. Prerequisite: Prior approval of instructor required before enrollment. Repeatable to 6 credits.

POLS 595. Professional Development in Public Administration. 1 Credit.
Specific issues will vary but topics will focus on the latest issues, trends, and problems facing administrators, especially those in public and not-for-profit agencies. Repeatable to 3 credits. Repeatable to 3 credits.
POLS 599. Master of Public Administration Capstone. 1 Credit. 
Seminar course intended to assist students in strengthening and further developing essential skills of research and formal presentation (written and oral) for both academic and professional audiences. Students will apply these skills to the completion of their individual Independent Study Project, providing an opportunity to draw upon knowledge and skills from across the program’s curriculum, and to synthesize these elements in the creation of a unique piece of rigorous professional policy analysis. Enrollment is restricted to MPA degree students who have presented a satisfactory Independent Study proposal to their review committee at the conclusion of the previous fall semester. Prerequisite: POLS 997. S.


POLS 997. Independent Study. 3 Credits. 
Seminar course that assists students in the process of developing, researching, composing, and presenting an Independent Study or Policy Paper on a public administration or public policy topic of their choosing, in consultation with one or more faculty advisors. Focused on familiarizing students with the craft of research writing and presentation and enabling them to communicate these findings clearly and effectively to a variety of audiences, orally and in writing. At the conclusion of the course, students will have completed and formally presented a full Policy Paper proposal and will have submitted a plan and timeline for project completion. Prerequisites: POLS 500 and POLS 501 or instructor consent; may be repeated once with approval of MPA Program Director if student received a grade of D or F for the course. Repeatable to 3 credits. F.

POLS 998. Thesis. 1-4 Credits.

Undergraduate Courses for Graduate Credit
POLS 404. Urban Politics and Administration. 3 Credits. 
Analysis of the socio-economic context of urban America and its impact on politics, policy, and administration. Prerequisite: POLS 115. S.

B.S.P.A./M.P.A. Combined Degree
The Public Administration program offers two options for exceptional undergraduate students wishing to pursue Masters-level work: the Combined Bachelor to Masters Program (CBM) and the Accelerated Bachelor to Masters Program (ABM). The intent of the combined programs are to allow qualified students to complete the requirements for both degrees in one year beyond that required to receive the baccalaureate degree. Students may apply for these programs upon completion of 60 credits toward the Bachelor’s degree but prior to their fourth year of academic work. All requirements for both degrees must be met. Up to six credits of prior-approved coursework may be double counted under the CBM program, and up to twelve credits of prior-approved coursework may be double-counted under the ABM program. Double-counted credits may not include required courses for the BSBA or BA degree, but may include appropriate elective coursework, preferably at the 500-level or above.

CBM 5 Year Degree Admission Requirements
The Combined Bachelor’s/Master’s (CBM) program allows undergraduate students at UND an opportunity to complete the requirements for both the bachelor’s and master’s degrees at an accelerated pace. These students may double count up to 6 graduate-level credits for both degrees. The completion of this program differs from the Accelerated Bachelor’s/Master’s program in that it is not constrained to the 4+1 time frame.

1. 3.25 GPA overall and in major.
2. Graduate Record Examination general test scores for review. The GRE requirement may be waived at the discretion of the MPA Program Director in accordance with program criteria. The decision of the MPA Program Director is final.
3. Completion of 60 credit hours prior to year four. The MPA Program Director may approve minor deviations from the 60 credit minimum to facilitate appropriate graduate course sequencing.
4. Minimum competence in public administration, policy, administrative services, and methodology. This competence is normally demonstrated by at least one course in each of the four fields (Political Science, Accounting, Economics, and Statistics), by special exams in the fields, or by practical experience. Accounting, Economics, and Statistics competencies may be met through the successful completion of self-paced boot camp courses on these topics from Ivy Software (http://ivysoftware.com).
5. Twenty hours in social sciences, business administration and related fields.
6. Students who do not meet requirements 4 and 5 will be given the opportunity to fulfill them.

ABM 5 Year Degree Admission Requirements
The ABM degree program allows exceptional undergraduate students at UND an opportunity to complete the requirements for both the bachelor’s and master’s degrees at an accelerated pace. All requirements for both degrees must be met, and these students may double count up to 12 graduate-level credits towards the requirements for both their Bachelor in Political Science or Public Affairs and their Master of Public Administration (MPA) degree requirements. ABM students must obtain their MPA degree within 12 months of completing the Bachelor’s degree, provided that the degree requirements can be completed in that timeframe.

High achieving high school students (GPA of at least 3.5/4.0 and an ACT score of 25 or higher) will initially be considered for “identified” status and become eligible for formal admission when they meet the same criteria that undergraduates must meet for admission into the ABM program. Admission is a competitive process. The following are minimum eligibility requirements:
1. Students must meet the School of Graduate Studies admissions eligibility requirements.
2. Students must have completed a minimum of 60 credits, including credits earned from advanced placement and dual credit. Students must apply before completion of the undergraduate degree.
3. Transfer students with a minimum of 60 credits—whether from the transfer institution alone or in combination with UND credits—must have a minimum cumulative GPA of 3.0/4.0 at the time of admission to the ABM program.
4. Students must have a minimum cumulative GPA of 3.0/4.0 at UND at the time of admission into the ABM program.
5. ABM program applicants must submit the standard application to the School of Graduate Studies, the application fee, a personal statement, 3 letters of recommendation, and transcripts.
6. Graduate Record Examination general test scores for review. The GRE requirement may be waived at the discretion of the MPA Program Director in accordance with program criteria. The decision of the MPA Program Director is final.
7. Additionally, ABM program applicants must submit a detailed Program of Study that describes the 12 credits of double counted courses, the courses that will be taken after being accepted into the MPA program, the courses that will be taken before graduation from the BS/BA program, and the expected graduation date for each degree. The submitted program of study must be signed by the student, the student’s undergraduate advisor, the student’s graduate advisor, and the MPA Program Director.

Degree Requirements
1. A minimum of 36 semester credits (6 CBM or 12 ABM) credits may be part of undergraduate degree program but taken for graduate credit).
2. A minimum of 27 credits in public administration and up to 9 credits in cognate fields to total 36 credits.
3. At least one-half must be at the 500-level.
4. A maximum of 9 credits may be transferred to UND from other institutions.

Freshman Year
<p>|</p>
<table>
<thead>
<tr>
<th>First Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 110</td>
<td>College Composition I</td>
</tr>
<tr>
<td>MATH 103</td>
<td>College Algebra</td>
</tr>
<tr>
<td>POLS 115 or POLS 116</td>
<td>American Government I or State and Local Government</td>
</tr>
<tr>
<td>POLS 120</td>
<td>Global Perspectives</td>
</tr>
<tr>
<td>Essential Studies: Lab Science</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>16</strong></td>
</tr>
</tbody>
</table>

Second Semester
|
|----------------|----------|
| COMM 110       | Fundamentals of Public Speaking | 3 |
| ENGL 130       | Composition II: Writing for Public Audiences  | 3 |
| **Total Credits** | **16** |
### University of North Dakota

#### Essential Studies: Humanities 3
#### Essential Studies: Fine Arts 3
#### Essential Studies: Social Science 3

<table>
<thead>
<tr>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>15</td>
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</tbody>
</table>

### Sophomore Year

#### First Semester

- **POL 200** or **POL 250**: Introduction to the Nonprofit Sector (POL 200 if pursuing the nonprofit track; POL 250 if pursuing the public administration track) 3
- **AGCT 200**: Elements of Accounting I 3
- **ECON 201**: Principles of Microeconomics 3
- **POL 215**: Politics and Diversity 3
- **Essential Studies: Fine Arts or Humanities**: 3

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<tr>
<th>Credits</th>
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<tbody>
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<td>15</td>
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</table>

#### Second Semester

- **POL 361** or **ECON 210**: Nonprofit Management (Undergrad) (POL 361 if pursuing the nonprofit track; ECON 210 if pursuing the public administration track) 3
- **Free Electives (Recommended 300 or above)**: 12

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<th>Credits</th>
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</tbody>
</table>

### Junior Year

#### First Semester

- **POL 300**: Introduction Research Methods 3
- **MGMT 300**: Principles of Management 3
- **Non Profit or Public Admin Elective**: 3
- **Free Electives**: 6

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<th>Credits</th>
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<tbody>
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<td>15</td>
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</table>

#### Second Semester

- **POL 437**: Administrative Processes 3
- **Non Profit or Public Admin Elective**: 3
- **Free Electives**: 9

<table>
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<th>Credits</th>
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<td>15</td>
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</table>

### Senior Year

#### First Semester

- **POL 500**: Research Methods 3
- **POL 531**: Foundations of Public Administration 3
- **Free Electives (Recommended 300 level or above)**: 9

<table>
<thead>
<tr>
<th>Credits</th>
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<tbody>
<tr>
<td>15</td>
</tr>
</tbody>
</table>

#### Second Semester

- **POL 501**: Political and Public Policy Analysis 3
- **POL 495**: Senior Colloquium in Political Science and Public Administration 3
- **Free Electives (Recommended 300 level or above)**: 6
- **Free Grad Electives or Track Electives**: 3

<table>
<thead>
<tr>
<th>Credits</th>
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<tbody>
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</table>

### Summer

- **POL 580**: Administrative Internship (May take during 5th year; see program guidelines for appropriate internship experience) 3

<table>
<thead>
<tr>
<th>Credits</th>
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<tbody>
<tr>
<td>3</td>
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</tbody>
</table>

### Fifth Year

#### First Semester

- **Free Grad Electives or Track Electives**: 12

<table>
<thead>
<tr>
<th>Credits</th>
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<tbody>
<tr>
<td>12</td>
</tr>
</tbody>
</table>

#### Second Semester

- **POL 532**: Public Policy 3
- **POL 570**: MPA Capstone 3

<table>
<thead>
<tr>
<th>Credits</th>
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<td>15</td>
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</table>

### Certificate in Health Administration

The health administration certificate program is designed to prepare people with diverse backgrounds already in the health care industry or those wishing to enter the fast growing and rapidly changing health care profession. Students admitted to the certificate program are required to complete four of the three-credit courses (12 credits total) listed below, and are required to maintain a 3.0 GPA in order to remain in the program.

<table>
<thead>
<tr>
<th>Courses:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Required Courses (6 credit hours)</strong></td>
</tr>
<tr>
<td>POL 551: Health Administration and Organization</td>
</tr>
<tr>
<td>POL 552: Health Policy</td>
</tr>
<tr>
<td><strong>Elective Courses (6 credit hours)</strong></td>
</tr>
<tr>
<td>POL 537: Program Evaluation</td>
</tr>
<tr>
<td>ECON 575: Advanced Special Topics</td>
</tr>
<tr>
<td>MPH 504: Planning and Management to Promote Health</td>
</tr>
</tbody>
</table>

* Also offered as POLS 593 Problems in Political Science and Public Administration: Leading and Managing Public Health Systems

### Certificate in Policy Analysis

This program seeks to provide the analytic skills needed by professionals from many academic backgrounds who are required to do or understand policy analysis and program planning in the public and not-for-profit sectors. Even managers who do not do research themselves must understand the work of others if they are to make informed decisions based on the information provided in research reports. Students admitted to the certificate program are required to complete four of the three-credit courses (12 credits total) listed below, and are required to maintain a 3.0 GPA in order to remain in the program.

<table>
<thead>
<tr>
<th>Courses:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Required Courses</strong></td>
</tr>
<tr>
<td>POLS 500: Research Methods</td>
</tr>
<tr>
<td>POLS 501: Political and Public Policy Analysis</td>
</tr>
<tr>
<td>POLS 532: Public Policy</td>
</tr>
<tr>
<td><strong>Elective Courses (3 credit hours)</strong></td>
</tr>
<tr>
<td>POLS 502: Problems in State and Local Governments</td>
</tr>
<tr>
<td>POLS 508: Legislative and Executive Processes</td>
</tr>
<tr>
<td>POLS 537: Program Evaluation</td>
</tr>
<tr>
<td>POLS 538: Public Budgeting and Financial Administration</td>
</tr>
<tr>
<td>POLS 552: Health Policy</td>
</tr>
<tr>
<td>POLS 593: Problems in Political Science and Public Administration</td>
</tr>
</tbody>
</table>

### Certificate in Public Administration

This program seeks to provide the management core needed by professionals from many academic backgrounds who have risen to positions of authority in the public and not-for-profit sector without benefit of formal management training. Students admitted to the certificate program are required to complete four of the three-credit courses (12 credits total) listed below, and are required to maintain a 3.0 GPA in order to remain in the program.

<table>
<thead>
<tr>
<th>Courses:</th>
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</thead>
<tbody>
<tr>
<td><strong>Required Courses</strong></td>
</tr>
<tr>
<td>POLS 500: Research Methods</td>
</tr>
<tr>
<td>POLS 501: Political and Public Policy Analysis</td>
</tr>
<tr>
<td>POLS 532: Public Policy</td>
</tr>
<tr>
<td><strong>Elective Courses (3 credit hours)</strong></td>
</tr>
<tr>
<td>POLS 502: Problems in State and Local Governments</td>
</tr>
<tr>
<td>POLS 508: Legislative and Executive Processes</td>
</tr>
<tr>
<td>POLS 537: Program Evaluation</td>
</tr>
<tr>
<td>POLS 538: Public Budgeting and Financial Administration</td>
</tr>
<tr>
<td>POLS 552: Health Policy</td>
</tr>
<tr>
<td>POLS 593: Problems in Political Science and Public Administration</td>
</tr>
</tbody>
</table>
Certified in Social Entrepreneurship

This certificate program seeks to provide individuals with diverse educational and professional backgrounds, an interdisciplinary core of knowledge necessary to craft, manage, and act within innovative business and nonprofit enterprises that address social needs, create public value, and achieve social change.

Admission Requirements
1. Students must hold a baccalaureate degree from an educational institution of recognized standing, as determined by the School of Graduate Studies.
2. Minimum cumulative undergraduate GPA of 2.75 or higher.
3. International students must meet the English language and other admission requirements of the University of North Dakota.
4. Students must submit an admission portfolio containing:
   a. A personal statement addressing how the certificate will help them meet their goals
   b. Official transcripts of all coursework completed
   c. Three (3) letters of reference
   d. A description of relevant work experience

Students should note that the above requirements represent minimum achievement levels necessary to be considered for admission; meeting these requirements does not guarantee admission.

Certificate Requirements
Students admitted to the certificate program are required to complete the four three-credit courses (12 credits total) listed below, and are required to maintain a 3.0 GPA in these four courses in order to remain in the program.

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>POLS 561</td>
<td>3</td>
</tr>
<tr>
<td>POLS 562</td>
<td>3</td>
</tr>
<tr>
<td>ENTR 575</td>
<td>3</td>
</tr>
<tr>
<td>ENTR 580</td>
<td>3</td>
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</tbody>
</table>

Sample Curricular Plan

<table>
<thead>
<tr>
<th>Year One</th>
<th>Law School</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year Two</td>
<td>Law School w/two MPA courses</td>
</tr>
<tr>
<td>Year Three</td>
<td>Law School w/two MPA courses</td>
</tr>
<tr>
<td>Year Four</td>
<td>Seven MPA courses + MPA Capstone</td>
</tr>
<tr>
<td>or</td>
<td></td>
</tr>
<tr>
<td>Year One</td>
<td>Eight MPA courses</td>
</tr>
<tr>
<td>Year Two</td>
<td>Law School</td>
</tr>
<tr>
<td>Year Three</td>
<td>Law School w/two MPA courses</td>
</tr>
<tr>
<td>Year Four</td>
<td>Law School w/one MPA course + MPA Capstone</td>
</tr>
</tbody>
</table>

* 2 MPA course requirements could be met with law courses as cognates.

Joint MPA/JD Complementary Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAW 150</td>
<td>2-3</td>
</tr>
<tr>
<td>LAW 201</td>
<td>2-3</td>
</tr>
<tr>
<td>LAW 203</td>
<td>2-3</td>
</tr>
<tr>
<td>LAW 206</td>
<td>2-4</td>
</tr>
<tr>
<td>LAW 210</td>
<td>3-5</td>
</tr>
<tr>
<td>LAW 238</td>
<td>3</td>
</tr>
<tr>
<td>LAW 263</td>
<td>3</td>
</tr>
<tr>
<td>LAW 277</td>
<td>2-3</td>
</tr>
<tr>
<td>LAW 281</td>
<td>3</td>
</tr>
<tr>
<td>LAW 289</td>
<td>3</td>
</tr>
<tr>
<td>LAW 291 (Poverty Law)</td>
<td>1-4</td>
</tr>
<tr>
<td>LAW 291 (Civil Rights)</td>
<td>1-4</td>
</tr>
<tr>
<td>LAW 291 (State Constitutional Law)</td>
<td>1-4</td>
</tr>
</tbody>
</table>

Or other courses with the approval of the MPA Director and Graduate Dean

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>POLS 502</td>
<td>3</td>
</tr>
<tr>
<td>POLS 508</td>
<td>3</td>
</tr>
<tr>
<td>POLS 531</td>
<td>3</td>
</tr>
<tr>
<td>POLS 532</td>
<td>3</td>
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<tr>
<td>POLS 533</td>
<td>3</td>
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<td>POLS 536</td>
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<td>POLS 538</td>
<td>3</td>
</tr>
<tr>
<td>POLS 539</td>
<td>3</td>
</tr>
</tbody>
</table>

Or other courses with the approval of the Dean of the Law School.

Master of Public Administration

Admission Requirements

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.
1. A four-year bachelor's degree from a recognized college or university.
2. A cumulative Grade Point Average (GPA) of at least 2.75 for all undergraduate work or a GPA of at least 3.0 for the junior and senior years of undergraduate work (based on A=4.00).
3. Graduate Record Examination (GRE) general test scores submitted for review. The GRE requirement may be waived at the discretion of the MPA Program Director in accordance with program criteria. The decision of the MPA Program Director is final.
4. A satisfactory score on the Test of English as a Foreign Language (TOEFL). For the internet-based TOEFL (TOEFL iBT) an overall score of 79 is required.
5. Minimum competence in public administration, administrative sciences, and methodology. This competence is normally demonstrated by at least one course in each of four fields (Political Science, Accounting, Economics, and Statistics), by special exams in the fields, or by practical experience. Accounting, Economics, and Statistics competencies may be met through the successful completion of self-paced boot camp courses on these topics from Ivy Software (http://ivysoftware.com).
6. Twenty credit hours in the social sciences, business administration, and related fields.
7. Students who do not meet requirements, 5 and 6, will be given the opportunity to fulfill them.

Degree Requirements

Students seeking the Master degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Master of Public Administration Program.

1. A minimum of 36 semester credits.
2. A minimum of 27 credits in public administration and up to 9 credits in cognate fields to total 36 credits.
3. At least one-half of the credits must be at the 500 level.
4. A maximum of nine credits may be transferred to UND from other institutions.

5. Required Courses:
   - POLS 500 Research Methods 3
   - POLS 501 Political and Public Policy Analysis 3
   - POLS 531 Foundations of Public Administration 3
   - POLS 532 Public Policy 3
   - POLS 570 MPA Capstone 3
   - POLS 580 Administrative Internship 3
   - General, Health Administration, or Social Entrepreneurship Track 9
   - POLS Electives or cognate/elective courses 9

Total Credits 36

* Students with a minimum of one year relevant administrative experience may petition the Graduate Program Director to have requirement waived and to substitute a 3-credit elective in its place.

6. General Track
Select a total of 9 credits from the following list. Up to 6 credit hours of POLS 593 may be applied to the degree with consent of the MPA Program Director

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>POLS 502</td>
<td>Problems in State and Local Governments</td>
</tr>
<tr>
<td>POLS 503</td>
<td>Government and Business</td>
</tr>
<tr>
<td>POLS 533</td>
<td>Administrative Ethics in the Public Sector</td>
</tr>
<tr>
<td>POLS 535</td>
<td>Public Organizations</td>
</tr>
<tr>
<td>POLS 536</td>
<td>Public Personnel Administration</td>
</tr>
<tr>
<td>POLS 537</td>
<td>Program Evaluation</td>
</tr>
<tr>
<td>POLS 538</td>
<td>Public Budgeting and Financial Administration</td>
</tr>
<tr>
<td>POLS 539</td>
<td>Administrative Law</td>
</tr>
<tr>
<td>POLS 562</td>
<td>Political Advocacy and Social Entrepreneurship</td>
</tr>
<tr>
<td>POLS 593</td>
<td>Problems in Political Science and Public Administration</td>
</tr>
</tbody>
</table>

Health Administration Track
Select a total of 9 credits from the following list.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>POLS 551</td>
<td>Health Administration and Organization</td>
</tr>
<tr>
<td>POLS 552</td>
<td>Health Policy</td>
</tr>
<tr>
<td>ECON 575</td>
<td>Advanced Special Topics</td>
</tr>
<tr>
<td>MPH 504</td>
<td>Planning and Management to Promote Health</td>
</tr>
</tbody>
</table>

Social Entrepreneurship Track
Select a total of 9 credits from the following list.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>POLS 561</td>
<td>Creation and Management of Social Enterprises</td>
</tr>
<tr>
<td>POLS 562</td>
<td>Political Advocacy and Social Entrepreneurship</td>
</tr>
<tr>
<td>ENTR 575</td>
<td>Special Topics (Sustainability) or approval from director</td>
</tr>
<tr>
<td>ENTR 580</td>
<td>Seminar in Social Entrepreneurship</td>
</tr>
</tbody>
</table>

* Also offered as POLS 593 Problems in Political Science and Public Administration: Leading and Managing Health Systems

Residence Requirement

There is no residence requirement for the M.P.A. degree; however, at least one-half of the credits for the degree must be taken on campus or as an admitted distance degree student.

Candidacy for the Degree

Admission of a student to the School of Graduate Studies as a degree student in Approved Status implies only that the student has met minimum entrance requirements and will be permitted to take graduate courses, which normally may be expected to lead to a degree. The student has not been admitted as a candidate for a degree. Advancement to candidacy can be granted only after the student has met certain academic requirements in approximately the following sequence:

1. Completion of 12 semester credits.
2. A GPA of at least 3.00 for all work attempted.
3. The appointment of an advisor. The advisor, who must be a member of the Graduate Faculty, will be appointed by the Dean upon the written recommendation of the M.P.A. program director. The advisor is responsible to the department and the School of Graduate Studies for the supervision of the student's work.
4. Approval of a Program of Study on a form available from the School of Graduate Studies. The program, which should be developed in consultation with the advisor, must carry the signature of the student, the advisor, and the program director and must be submitted to the Dean of the School of Graduate Studies for approval.
5. Completion of the MPA Capstone course with a grade of B or better.

The student and the advisor will be notified in writing of the advancement to candidacy. Students must complete all requirements for advancement to candidacy prior to the semester in which they plan to graduate.

Public Health

Master of Public Health (p. 539)
Accelerated Bachelor in Public Health Education/Master of Public Health (http://und-public.coursesleaf.com/graduateacademicinformation/departmentalcoursesprograms/publichealth/accel)
Certificate in Public Health (p. 539)

Courses

MPH 504. Planning and Management to Promote Health. 3 Credits.
This course introduces students to the field of public health and develops their appreciation of the unique and important role of public health in promoting health and preventing disease and disability in communities and populations; their understanding of the principles of population health; and their knowledge of how public health functions today, including its organization, financing, policy priorities, and core functions in the United States and other countries. Prerequisite: Enrollment in MPH degree program or certificate. On demand.
MPH 505. Public Health Data Management in SAS. 1 Credit.
This course introduces students to the basics of data management using the statistical software SAS. The course emphasizes management and manipulation of large data sets using the active learning approach. Students need to bring their laptop computers to class, as well as a flash drive on which to store SAS programs and data sets. Data for exemplification will be chosen from the large array of online and publicly available health-related data sets. Prerequisite: Enrollment in MPH degree program or certificate. On demand.

MPH 506. Public Health Data Management in R. 1 Credit.
This course introduces students to the basics of data management using the statistical software R. The course emphasizes management and manipulation of large data sets using the active learning approach. Students need to bring their laptop computers to class, as well as a flash drive on which to store R programs and data sets. Data for exemplification will be chosen from the large array of online and publicly available health-related data sets. Prerequisite: Enrollment in MPH degree program or certificate. On demand.

MPH 510. Public Health & Health Care Systems. 2 Credits.
This course provides an overview of the U.S. public health and health care systems as well as current health policy issues. Topics are addressed from a comparative effectiveness perspective and evaluate how U.S. health systems perform relative to other countries and systems. Prerequisite: Enrollment in MPH degree program or certificate. On demand.

MPH 520. Environmental Health. 2 Credits.
This course introduces the key concepts, principles, and applications of the primary science disciplines that underpin environmental health. It provides an overview of the major pollutants including their detection, impact on health, and principles of remediation. Ethical issues related to environmental health are discussed. Prerequisite: Enrollment in MPH degree program or certificate. On demand.

MPH 531. Biostatistics 1. 3 Credits.
This MPH Core course introduces the selection, use, and interpretation of basic statistical tests and concepts that may be used in addressing, analyzing, and solving problems in public health and health care research. Prerequisite: Enrollment in MPH degree program or certificate. On demand.

MPH 532. Biostatistics 2. 3 Credits.
This course continues the introduction to biostatistics begun in MPH 531 on the selection, use, and interpretation of basic statistical tests and concepts that may be used in addressing, analyzing, and solving problems in public health and health care research. Topics include multiple linear regression, analysis of variance as a special case of multiple linear regression, and an introduction to logistic regression. Prerequisite: MPH 531. F.S.SS.

MPH 533. Advanced Biostatistics. 3 Credits.
This course develops advanced skills in biostatistics, with an emphasis on applied research in public health and medicine. Students learn how to derive quantitative answers to an applied research question by using multivariate statistical modeling. The course covers advanced topics in analysis of variance, linear and logistic regression, survival analysis, and generalized linear models. Prerequisites: MPH 532 and MPH 550. F.S.SS.

MPH 534. Bioinformatics. 3 Credits.
This course introduces bioinformatics techniques and tools in analysis of various types of high-throughput biomedical data, such as microarray, genotyping and next-generation sequencing data. Students will learn the essential principles of conducting genomics research, and will gain hands-on experience of bioinformatics research using real research data. The advanced bioinformatics methods, such as data mining, graph theory, and high performance computing, are discussed. Prerequisite: Permission of Instructor. On demand.

MPH 535. Health Care Data Mining. 3 Credits.
This course covers data mining concepts and methods that are important for health informatics. Basic topics in clustering and classification, such as hierarchical clustering, logistic discrimination, decision tree, variable selection, Bayesian decision model, and others are introduced. Students learn the techniques of data mining from an applications perspective. Students will have access to large healthcare datasets in a local server computer and have hands-on experience using data mining software. Prerequisite: Permission of Instructor. On demand.

MPH 538. Introduction to Structural Equation Analysis. 3 Credits.
This course provides (a) introductory coverage of confirmatory latent variable techniques, including confirmatory factor analysis and structural equation methods; (b) in-depth presentation of special issues related to the application of these techniques in social science-based research; and (c) a comparison of these techniques with traditional analytical approaches. Prerequisite: Graduate statistics course with knowledge of linear multiple regression. On demand.

MPH 541. Public Health Communication. 2 Credits.
This is a two credit hour course designed to provide students with a critical understanding of the effects of the media on social, and participatory-in promoting and impeding the achievement of public health goals. This course introduces social and behavioral sciences theories, methods that are applied to public health problems, and how public health principles are communicated. Students will develop the skills necessary to use media strategically to advance public health policies and social change. The course covers the design, implementation and evaluation of media campaigns to promote public health goals, examines theories and research on media influences with respect to its potential harmful effects on wellbeing, and students design a health communication campaign. Prerequisite: Enrollment in MPH degree program or certificate. On demand.

MPH 544. Leadership of Health Care Organizations. 3 Credits.
Leaders of health care organizations can promote or inhibit optimum performance and desirable change. Students learn how to analyze and assess leadership qualities through application of leadership theories, methods, and techniques. Topics include leadership versus management, leading organizational change, dealing with workforce and organizational challenges, and related subjects. Prerequisite: MPH major or instructor consent. On demand.

MPH 545. Public Health Leadership & Interprofessional Practice. 3 Credits.
This is a three credit hour course designed to introduce students to major theories and concepts of leadership, ways of applying these to public health issues requiring leadership, and provides an opportunity for students to develop skills and resources for further developing leadership skills. The course focuses on preparing healthcare professionals with the foundational skills needed to work in teams to effectively collaborate and coordinate services in population health management. Key themes focused on interprofessional communication, collaboration, leadership, and professionalism will be ingrained throughout content. Prerequisite: Admission into MPH Program or prior approval from instructor. On demand.

MPH 550. Population Health Research Methods. 3 Credits.
This course provides an overview of the research process including formulation of a research problem, selection of a research design, construction of an instrument for data collection, selection of a sample, collection and processing of data, and writing a research report. Topics include how to identify a research question; reasons and procedures for reviewing the literature; observational and interventional research designs; and commonly used measures in public health-related research. Prerequisites: MPH 531. On demand.

MPH 551. Epidemiology. 3 Credits.
This course introduces the basic epidemiologic concepts used to study health and disease in populations including measurement, study design, and related statistical tests. Observational and experimental epidemiologic studies are described and their advantages and disadvantages compared. The course provides an overview of the major causes of morbidity and mortality in populations. Ethical issues related to epidemiology are discussed. Prerequisite: Enrollment in MPH degree program or certificate. On demand.

MPH 552. Epidemiology 2. 3 Credits.
This is a three credit hour course designed to provide students with a critical understanding of intermediate epidemiological principles. This second course of epidemiology is a continuation of the MPH 551 Epidemiology course which introduced basic epidemiology concepts to the students. MPH 552 (Epidemiology 2) covers methods and techniques for designing, implementing, analyzing and interpreting observational studies, including cross-sectional, case-control and cohort studies. Prerequisites: MPH 531 and MPH 551. On demand.
MPH 553. Population Health Outcomes Research. 3 Credits.
This course is designed to give students hands-on-experience analyzing existing health data - administrative claims, electronic medical records, and patient surveys - to evaluate health outcomes. Students develop analytic expertise and gain practical experience creating common outcome measures including utilization of health services such as office visits, visits to primary care providers, hospitalizations, and emergency room visits and their associated costs. Other outcome measures include general health and functional status, behavioral health problems such as depression, and quality of life. Common methodological issues associated with analyzing these data such as matching, risk adjustment, and selection bias are discussed. Prerequisite: Completion of MPH core courses or consent of instructor. On demand.

MPH 554. Continuous Quality Improvement for Health Care Organizations. 3 Credits.
This course provides a detailed view of quality improvement techniques, methods, and evaluation in health care organizations. The knowledge gained from these quality improvement methods enable students to identify, address, analyze, and solve organizational quality shortcomings with the ultimate goal of improving healthcare quality. Topics include quality assessment, quality assurance, total quality management, continuous quality improvement, health care reform related to quality improvement, patient safety, and quality health outcomes. Prerequisites: MPH 510 and MPH major or instructor consent. On demand.

MPH 555. Health Law & Policy Analysis. 3 Credits.
The U.S. health system is undergoing significant transformation, and public health has a critical role at the federal, regional, state, and local levels. Students will learn advanced skills in applied health policy including: evaluating proposed legislation and reform; researching health legislation (e.g., Public Health Service Act, Social Security Act, Affordable Care Act); understanding the rulemaking process at state and federal agency levels once laws are enacted; conducting literature reviews; analyzing the evidence base for public health policy interventions; writing brief summaries of proposed legislation; giving testimony to inform health policy decisions; summarizing the pros and cons of health policy interventions; and identifying potential opponents, proponents, advocates, and stakeholders related to specific health law policy issues and interventions. Prerequisite: POLS 552. On demand.

MPH 556. System Dynamics 1. 3 Credits.
This course provides an introduction to the System Dynamics field of study which is a computer-aided approach to improving system performance through policy analysis and design. The knowledge and critical thinking skills gained from this course will enable students to work either independently or on interdisciplinary teams to effectively deal with problems arising from dynamically complex systems. Topics include: perspective and process; tools for systems thinking; the dynamics of growth; tools for modeling dynamic systems; instability and oscillation; model testing; and challenges for the future. This course is open to UND graduate students in all disciplines. On demand.

MPH 557. System Dynamics 2. 3 Credits.
This course builds on MPH 556. System Dynamics 1. This course will enable students to effectively plan and manage System Dynamics projects by providing knowledge and skill relating to advanced modeling techniques, software capabilities, and client engagement processes. Topics include: model building, documentation and presentation best practices; use of historical data; model calibration and testing techniques; advanced software features; group model building; and implementation challenges. This course is open to UND graduate students in all disciplines. Prerequisite: MPH 556. On demand.

MPH 570. Special Topics in Population Health. 1-3 Credits.
This course explores special topics in the field of population health. Topics vary with faculty expertise and issues current in the field. The course may be repeated for credit if the topics are different. Prerequisite: Approval of Faculty Advisor. Repeatable to 6 credits. F.S.SS.

MPH 572. Health Care Budgeting and Finance. 3 Credits.
This course focuses on learning and applying financial and managerial accounting principles and techniques to health services organizations. The subject matter is designed to provide a working knowledge of accounting, finance, and budget terminology. Components of the class include the evolution of healthcare finance and reimbursement, revenue and expense classifications, financial reporting, budgeting, financial analysis, financing of public health agencies, and the current and anticipated financial impact of healthcare reform on the healthcare industry and health services organizations. Prerequisite: MPH major or instructor consent. On demand.

MPH 574. Foundations of Health Economics. 3 Credits.
This course serves as an introduction to the role of economics in health care and health policy. The microeconomic principles of supply and demand are introduced, and topics such as the demand for health, the derived demand for medical care, and the demand for health insurance are covered. On the supply side, the course examines the supply of medical care by physicians and hospitals, medical technology, and the role of managed care organizations. Implications of adverse selection, moral hazard, externalities, and asymmetric information are addressed. Cost benefit and cost effectiveness analyses are also introduced. The course examines the role of government in health care and health care reform including the implications of expanding insurance coverage under the Affordable Care Act. The effectiveness and efficiency of various health policies are also addressed, including government forms of insurance coverage such as Medicare, Medicaid, and the Department of Veterans’ Affairs, price regulation of hospitals, provider payment reform, medical malpractice, uncompensated care, and health care workforce issues. Prerequisite: College Algebra and one of the following: Basic Statistics or Biostatistics, Introductory Micro- or Macro- Economics; or Consent of Instructor. On demand.

MPH 581. Principles of Indigenous Health. 3 Credits.
This is a three credit hour course designed to provide students with a critical understanding of determinants of Indigenous health and health disparities. In this course we will define Indigenous populations, histories, cultures, societies, traditional healing systems, food sources, patterns and impact of colonization, and health disparities. We will address historical and ongoing traumas associated with colonization and colonialism, understanding Indigenous concepts of health and healing, and ways of moving toward health equity. Populations we will assess include American Indian/Alaska Native, First Nations, Inuit, S召开, Aboriginal Australian, Maori, Ainu, and Pacific Islanders. Prerequisite: Admission into MPH Program or permission from the instructor. On demand.

MPH 582. Social & Ecological Determinants of Indigenous Health. 3 Credits.
This is a three credit hour course designed to provide students with the skillsets to apply the Social-Ecological Model to Indigenous Health through an Indigenous lens. Key concepts and determinants of health will include: Social determinants of Indigenous Health, Indigenous environmental health and environmental justice. Impact of discrimination and marginalization of Indigenous populations, Social and Ecological case studies. Prerequisite: Admission into MPH Program or prior approval of instructor. On demand.

MPH 583. American Indian Health Policy. 3 Credits.
The American Indian (AI) population is unique in the United States in that AIs are born with a legal right to health services. This is based on treaties and numerous other laws, executive orders, court decisions and other legal bases in which the tribes exchanged land and other natural resources for various social services, including housing, education, and healthcare. The Indian Health Service (IHS) is the federal agency responsible for carrying out the federal government’s trust responsibility to provide public health and healthcare services to AIs. Prerequisite: Admission into MPH Program or prior approval from instructor. On demand.

MPH 584. Public Health Programming in Indigenous Populations. 3 Credits.
This is a three credit hour course designed to provide students with the knowledge and strategies needed to develop and implement effective public health programs in Indigenous populations to address significant public health disparities. Key areas of focus include: Developing the Ten Essential Public Health Services in Indigenous Populations, Indigenous Research Program Evaluation Frameworks, Grant writing and management, Funding sources for Indigenous Public Health programming. Case Studies/Best and Promising Practices in Indigenous Public Health. Prerequisite: Admission into MPH Program or prior approval from instructor. On demand.

MPH 590. MPH Seminar in Leadership and Advocacy. 1 Credit.
The MPH Seminar is one component of the MPH Culminating Experience, and enrollment is concurrent with MPH 995. Presentations, discussions, and activities focus on developing knowledge and skills that prepare students to be effective public health leaders and advocates. Prerequisite: Complete all MPH core courses. Corequisite: MPH 995. On demand.
MPH 594. Practicum. 1-3 Credits.
The Practicum is a planned, supervised, and evaluated practice experience. It provides an opportunity to apply basic public health competencies acquired through coursework. The Practicum is a group experience designed to meet MPH curricular goals and the needs of participating Practicum organizations. Prerequisites: Enrollment in MPH degree program, completion of core courses and consent of instructor. Repeatable to 3 credits. On demand.

MPH 596. Public Health Internship. 6-24 Credits.
The internship is a professional experience in an approved public health-related agency or organization. An internship is optional for MPH students, and can be paid or unpaid. It does not replace the 42-credit required coursework for the MPH degree but is an additional training experience, which would be undertaken when most or all MPH coursework is complete. Prerequisite: Approval of MPH program director. Repeatable to 24 credits. S/U grading. On demand.

MPH 995. Integrative Learning Experience. 2 Credits.
The Scholarly Project is one component of the MPH Capping Experience, and enrollment is concurrent with MPH 590. Students complete a project that demonstrates synthesis and application of knowledge acquired through coursework and other public health learning experiences. Prerequisite: Complete all MPH core courses or instructor permission. Corequisite: MPH 590. F.S.S.

MPH 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

Graduate Certificate in Public Health

The Graduate Certificate in Public Health is offered as part of the MPH Program. It is designed for people who wish to obtain formal training in public health, but do not want to earn the MPH degree. These include people currently working in the public health and health care fields, as well as others. The Graduate Certificate in Public Health requires completion of 15 credits. Students may earn the certificate in one of two emphases: General Public Health or Population Health Analytics. Each emphasis requires completion of 15 credits, and both require biostatistics and epidemiology. In addition to these two common courses, the General Public Health emphasis requires 3 other MPH core courses, and the Population Health Analytics focus requires research methods and two analytics electives. Applicants must meet all admissions requirements of the MPH Program except completion of a standardized test. All credits from the certificate program can be transferred to the Graduate Certificate in Public Health will be eligible to sit for the CPH examination. For more information and CPH requirements, visit: https://www.rnphe.org.

Area of Emphasis: General Public Health

The following courses are required for the General Public Health emphasis in the Graduate Certificate in Public Health.

<table>
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<tr>
<th>Course</th>
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<td>MPH 510</td>
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<td>MPH 531</td>
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<td>POLS 552</td>
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<td>Public Health Communication</td>
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Area of Emphasis: Population Health Analytics

The following courses are required for the Population Health Analytics emphasis in the Graduate Certificate in Public Health.

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<td>MPH 506</td>
<td>Public Health Data Management in R</td>
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MPH 532 Biostatistics 2 | 3
MPH 590 MPH Seminar in Leadership and Advocacy | 1

Master of Public Health

Admission Requirements

1. Completion of the online application and payment of the application fee.
2. A baccalaureate degree or equivalent from an accredited college or university (4-year for U.S.; degrees, accreditation by one of the six regional accreditating associations: MSA, NASC, NCA, NEASC-CHE, SACS-CC or WACS-Sr.).
3. An undergraduate and graduate (if applicable) cumulative grade point average (GPA) of at least 3.00.
4. A standardized test.* One of the following tests is required: Graduate Record Examination (GRE) General Test, Medical College Admission Test (MCAT), Graduate Management Admission Test (GMAT), Dental Admission Test (DAT), or Law School Admission Test (LSAT). There is no minimum score required for admission. Scores are used in combination with other indicators to determine eligibility for the MPH program. Standardized test scores must be sent by the testing service directly to UND. The institution code for the UND is 6878.
   a. "A standardized test is not required of applicants who have completed an advanced degree (Master's degree or higher) in a graduate program at an accredited U.S. or Canadian institution of higher learning.
   b. "A standardized test is not required of applicants who have a minimum of five years of relevant experience in public health that demonstrates ability to engage in graduate level coursework in the field of public health. Please contact the MPH Program Manager for more information.

5. Fluency in written and spoken English. All non-native speakers of English must meet the School of Graduate Studies requirements regarding fluency in written and spoken English. Please refer to the School of Graduate Studies website (http://graduateschool.und.edu/graduate-students/new/admissions-international.cfm#language-proficiency).

Applicants are required to submit the following supporting documentation:

1. A written statement that describes the applicant's professional goals and motivation for seeking a degree in public health.
2. A resume listing work experience, including voluntary, and relevant accomplishments, awards, and honors.
3. Official post-secondary academic transcripts from all institutions attended.
4. Three (3) letters of recommendation from individuals who the applicant feels are most qualified to evaluate their academic potential and leadership potential in public health.

The Admissions Committee may request an in-person or Skype interview with an applicant to assist in the decision process. A background check will be completed on each student before admission is final.

Program Requirements

The MPH program requires the successful completion of at least 42 credits of coursework. The MPH Core curriculum covers all competencies and areas of foundational knowledge required for public health programs accredited by the Council on Education for Public Health (CEPH). The MPH program also requires completion of an 12 credit specialization in Population Health Research & Analytics, Indigenous Health, or Health Management & Policy; a 3 credit Practicum; and a 3 credit Integrative Learning Experience. The core curriculum and the specialization curricula in Indigenous Health and Health Management & Policy are available online, and the specialization curriculum in Population Health Research & Analytics is available in-person and through distance education/interactive video network.
Degree Requirements

Students seeking the Master of Public Health degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Master of Public Health Program.

Coursework

Required MPH Core Coursework (21 credits):

- MPH 531 Biostatistics 1 3
- MPH 551 Epidemiology 3
- MPH 541 Public Health Communication 2
- MPH 510 Public Health & Health Care Systems 2
- MPH 504 Planning and Management to Promote Health 3
- POLS 552 Health Policy 3
- MPH 520 Environmental Health 2
- MPH 545 Public Health Leadership & Interprofessional Practice 3

MPH Practice Experience

MPH 594 Practicum, 3 credits

The Practicum is a planned, supervised, and evaluated practice experience. It provides an opportunity to apply basic public health competencies acquired through coursework. The Practicum is designed to meet student goals, specialization criteria, and the needs of the Practicum organization. An approved proposal is required prior to enrollment in this course.

MPH Integrative Learning Experience

The MPH core courses must be completed before beginning the Culminating Experience.

MPH 995 Integrative Learning Experience, 2 credits

The Scholarly Project is one component of the MPH Culminating Experience, and enrollment is concurrent with MPH 590. Students complete a project that demonstrates synthesis and application of knowledge acquired through coursework and other public health learning experiences.

MPH 590 MPH Seminar, 1 credit

The MPH Seminar is one component of the MPH Culminating Experience, and enrollment is concurrent with MPH 995. The course addresses current issues in public health. Presentations and discussions focus on dissemination, synthesis, and application of knowledge acquired through coursework and other public health learning experiences.

MPH Optional Internship Experience

MPH 596 Public Health Internship, 6-24 credits

The Public Health Internship is a professional experience in an approved public health-related agency or organization. An internship is optional for MPH students, and can be paid or unpaid. It does not replace the 42-credit required coursework for the MPH degree but is an additional training experience, which would be undertaken when most or all MPH coursework is complete.

Specializations

The three MPH specializations - Health Management & Policy, Population Health Research & Analytics, and Indigenous Health - provide integrative and practical learning experiences that are designed to foster intellectual growth, critical thinking, and essential problem-solving and communication skills. Graduates are prepared to work in many regional, national, and international settings including public health and other government agencies, health care delivery organizations, health plans, non-governmental health organizations, and academic institutions. Each specialization consists of 9 credits.

Health Management and Policy Specialization

The specialization in Health Management & Policy provides students with skills needed to manage health care and public health systems effectively and efficiently, analyze and evaluate health policies, and communicate successfully to effect improvements in the health care and public health systems. The curriculum for the specialization is offered in partnership with the College of Business and Public Administration, which adds depth to the faculty expertise and course offerings available to MPH students.

REQUIRED COURSES = 12 credits

- POLS 551 Health Administration and Organization 3
- MPH 572 Health Care Budgeting and Finance (Students take either MPH 574 or MPH 572) 3
- MPH 555 Health Law & Policy Analysis 3
- MPH 583 American Indian Health Policy 3

ELECTIVE COURSES = 3 credits

With advisor approval, other courses may be substituted.

- POLS 501 Political and Public Policy Analysis 3
- POLS 561 Creation and Management of Social Enterprises 3
- POLS 562 Political Advocacy and Social Entrepreneurship 3
- MPH 574 Foundations of Health Economics 3
- MPH 558 System Dynamics 2 3
- GEOG 474 Introduction to Geographic Information Systems (GIS) 2
- GEOG 474L GIS Laboratory (Co-requisite with GEOG 474) 1
- GEOG 574 Advanced Techniques in Geographic Information Systems 3
- EFR 510 Qualitative Research Methods 3
- POLS 537 Program Evaluation 3

Indigenous Health Specialization

The specialization in Indigenous Health is unique nationally in that students will develop the skillset required to effectively promote public health in Indigenous populations both in the United States and internationally. The curriculum includes analysis of the impact of colonization on health as well as current-day social, policy, environmental, and ecological determinants of health in Indigenous populations. Strategies and best practices in developing and implementing public health programs in Indigenous populations is also covered.

REQUIRED COURSES = 12 credits

- MPH 581 Principles of Indigenous Health 3
- MPH 582 Social & Ecological Determinants of Indigenous Health 3
- MPH 583 American Indian Health Policy 3
- MPH 584 Public Health Programming in Indigenous Populations 3

ELECTIVE COURSES = 3 credits

With advisor approval, other courses may be substituted.

- POLS 501 Political and Public Policy Analysis 3
- MPH 570 Special Topics in Population Health 1-3
- POLS 561 Creation and Management of Social Enterprises 3
- POLS 562 Political Advocacy and Social Entrepreneurship 3
- MPH 574 Foundations of Health Economics 3
- MPH 558 System Dynamics 2 3
- GEOG 474 Introduction to Geographic Information Systems (GIS) 2
- GEOG 474L GIS Laboratory (Co-requisite with GEOG 474) 1
- GEOG 574 Advanced Techniques in Geographic Information Systems 3
- EFR 510 Qualitative Research Methods 3
- POLS 537 Program Evaluation 3
Population Health Research & Analytics Specialization

The specialization in Population Health Research & Analytics provides students with skills needed to produce convincing and scientifically sound information about population health, evaluate the effectiveness of population health interventions, and provide the basis for improving health policies and programs. The course of study includes training in research methods, biostatistics, informatics, and communication of scientific results. Students learn how to design outcomes and comparative effectiveness studies, collect and analyze population health data, and communicate results.

REQUIRED COURSES = 13 credits

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Social Work

Master of Social Work (p. 542)

Courses

SWK 501. Human Behavior in the Social Environment I. 2 Credits.
Generalist Human Behavior in the Social Environment I (HBSE I) provides students with foundational knowledge relevant to human life span development, and an introduction to social work systems perspectives. Students critique and apply various frameworks to case scenarios that exemplify client differences in biological, psychological, social, spiritual, and cultural domains. Prerequisite: Admission to the MSW program. Prerequisite or Corequisite: SWK 507.

SWK 502. Human Behavior in the Social Environment II. 2 Credits.
In Human Behavior and the Social Environment II (HBSE II), students acquire foundational knowledge of social work theories relevant to group, community, and organizational practice. The course emphasizes applications of theory to practice for purposes of enhancing economic, social, and environmental well-being. Students learn to recognize diversity through multiple factors, and deepen understanding of how these differences can influence poverty and marginalization, as well as power and privilege. Prerequisite: Admission to the MSW program. Prerequisite or Corequisite: SWK 507.

SWK 503. Generalist Practice with Individuals and Families. 2 Credits.
Generalist Practice with Individuals and Families provides foundational knowledge, values, and skill development for generalist social work practice with individuals and families using a strengths-based perspective. Students develop skills in relationship-building, assuming collaborative partnerships, describing problems, accessing resources, developing intervention plans, and evaluating progress with individuals and families. Prerequisite: Admission to the MSW program. Prerequisite or Corequisite: SWK 501.

SWK 504. Generalist Practice with Treatment and Task Groups. 2 Credits.
In Generalist Practice with Treatment and Task Groups, students develop foundational knowledge, values, and skills necessary for assessing, intervening, and evaluating with the context of group practice. The course emphasizes the identification, analysis, and implementation of evidence-based interventions. Students also learn to apply a social justice framework to group practice. Prerequisites or Corequisites: SWK 501 and SWK 502.

SWK 505. Generalist Practice with Communities and Organizations. 2 Credits.
Generalist Practice with Communities and Organizations acquaints students with the historical roots of social work in community and organizational practice, and with the changing landscape of organizations within the human service sector. Students develop skills relevant to engaging, assessing, intervening, and evaluating community and organizational practice and develop strategies for macro-practice with diverse populations. Prerequisite or Corequisite: SWK 502.

SWK 506. Social Policy. 2 Credits.
Provides a basic understanding of the history and current patterns of social welfare services in the United States. Students apply a policy analysis framework to identify key issues, understand policy development, and assess the role of social policies and political processes on the well-being of individuals, families, and communities. Students also learn to identify opportunities for actively engaging in the policy arena. Prerequisite: Admission to the MSW program.

SWK 507. Generalist Research Methods and Analysis. 2 Credits.
This introductory course provides students with foundational knowledge of research methods and analysis, and prepares them for the development of advanced research skills. Students gain knowledge of the methods of scientific inquiry and how to construct and utilize evidence-informed research for practice. The course emphasizes ethical approaches to research and the effective communication of empirically-based knowledge. Prerequisite: Admission to the MSW program.

SWK 515. Generalist Practice Field Education I. 3 Credits.
Generalist field internship placement in a human service organization. Students apply foundation coursework, emphasizing core competencies and demonstration of practice behaviors. Prerequisite: Admission to field program. Corequisite: SWK 516. S/U grading. F.

SWK 516. Generalist Practice Field Education Seminar I. 1 Credit.
Integration of foundation coursework with field internship placement in a human service organization. Continued development of identification with the Social Work profession is emphasized, as is application of Social Work ethics and values. Corequisite: SWK 515. F.

SWK 517. Generalist Practice Field Education II. 5 Credits.

SWK 518. Generalist Practice Field Education Seminar II. 1 Credit.
Integration of foundation coursework with field internship placement in a human service organization. Continued development of identification with the Social Work profession is emphasized, as is application of Social Work ethics and values. Corequisite: SWK 517. S.

SWK 527. Advanced Generalist Human Behavior and the Social Environment I. 2 Credits.
In Advanced Generalist Human Behavior and the Social Environment I (AG HBSE I), students learn to synthesize and differentially apply relevant conceptual frameworks to guide advanced generalist practice with individuals and families. This course builds upon developmental theories and the social work ecological and systems perspectives. Prerequisite: Admission to the Advanced Generalist Concentration.

SWK 528. Advanced Generalist Human Behavior and the Social Environment II. 2 Credits.
Advanced Generalist Human Behavior and the Social Environment II (AG HBSE II) considers practice theories in relation to social and economic justice. Complexity theory builds upon traditional social systems theory to provide and advanced framework for analyzing practices within the social, economic, and natural environments. Prerequisite: Admission to the Advanced Generalist Concentration.
SWK 529. Advanced Generalist Research Methods and Analysis. 2 Credits.
Advanced Generalist Research Methods and Analysis prepares students to build on foundation research knowledge to further refine and advance the quality of social work practice and that of the larger social work profession. The course emphasizes program as well as practice evaluation. Students use research methods to generate surveys; learn to choose, utilize, and interpret reliable and valid measurement instruments; and apply both qualitative and statistical analysis. Prerequisite: Admission to the Advanced Generalist Concentration.

SWK 530. Advanced Generalist Practice with Individuals. 2 Credits.
Advanced Generalist Practice with Individuals helps students refine and deepen their conceptual and technical knowledge of social work practice with individuals. The course equips students with advanced generalist skills to guide engagement, assessment, intervention, and evaluation with individual clients. Course assignments promote ethical and evidence-based practice relevant to diverse populations. Prerequisite: Admission to the Advanced Generalist Concentration. F,SS.

SWK 532. Advanced Generalist Practice with Families. 2 Credits.
Advanced Generalist Practice with Families teaches students advanced generalist skills in working with families to engage, assess, intervene and evaluate client systems. This class builds upon family therapy theories and their practical applications. Activities and assignments build skills necessary to work with families in therapeutic settings. Prerequisite: Admission to the Advanced Generalist Concentration. F, S,SS.

SWK 533. Advanced Generalist Practice with Communities. 2 Credits.
Advanced Generalist Practice with Communities equips students with theoretical frameworks and models for community and policy practice, and prepares students to be effective change agents and leaders in community contexts. Students develop a deeper social and economic development orientation, and gain a greater understanding of the changing socio-political contexts of practice, including globalization and the human rights movement. Prerequisite: Admission to the Advanced Generalist Concentration. F, S.

SWK 534. Advanced Generalist Practice with Organizations. 2 Credits.
Advanced Generalist Practice with Organizations develops practice behaviors related to organizational leadership, managing various organizational systems, and developing an integrated practice approach for the purpose of promoting effective service delivery. Prerequisite: Admission to the Advanced Generalist Concentration. S.

SWK 535. Advanced Generalist Practice with Organizations. 2 Credits.
Advanced Generalist Practice with Organizations teaches students advanced generalist skills in working with families to engage, assess, intervene and evaluate client systems. This class builds upon family therapy theories and their practical applications. Activities and assignments build skills necessary to work with families in therapeutic settings. Prerequisite: Admission to the Advanced Generalist Concentration. F, S,SS.

SWK 536. Advanced Generalist Tools for Policy. 1 Credit.
Advanced Generalist Tools for Policy emphasizes the development of skills for effective policy action to promote social, economic, political, and environmental well-being. Prerequisite: Admission to the Advanced Generalist Concentration. S, SS.

SWK 537. Advanced Generalist Practice Field Education Seminar I. 1 Credit.
Integration of concentration coursework with field internship placement in a human service organization. Understanding the role of the MSW-level Social Worker is emphasized, as is advanced application of Social Work ethics and values. Corequisite: SWK 580. F, S,SS.

SWK 538. Advanced Generalist Practice Field Education Seminar II. 5 Credits.
Advanced Generalist Practice Field Education Seminar II. 5 Credits.
Advanced generalist field internship placement in a human service organization. Students apply concentration coursework emphasizing core competencies and demonstration of practice behaviors. Corequisite: SWK 583. Prerequisite or Corequisite: SWK 580. S/U grading. F, S, SS.

SWK 581. Advanced Generalist Research Methods and Analysis. 2 Credits.
Advanced Generalist Research Methods and Analysis prepares students to build on foundation research knowledge to further refine and advance the quality of social work practice and that of the larger social work profession. The course emphasizes program as well as practice evaluation. Students use research methods to generate surveys; learn to choose, utilize, and interpret reliable and valid measurement instruments; and apply both qualitative and statistical analysis. Prerequisite: Admission to the Advanced Generalist Concentration.

SWK 582. Advanced Generalist Practice Field Education Seminar II. 5 Credits.
Advanced Generalist Practice Field Education Seminar II. 5 Credits.
Advanced generalist field internship placement in a human service organization. Students apply concentration coursework emphasizing core competencies and demonstration of practice behaviors. Corequisite: SWK 583. Prerequisite or Corequisite: SWK 580. S/U grading. F, S, SS.

SWK 583. Advanced Generalist Practice Field Education Seminar II. 1 Credit.
Integration of concentration coursework with field internship placement in a human service organization. Understanding the role of the MSW-level Social Worker is emphasized, as is advanced application of Social Work ethics and values. Corequisite: SWK 582. F, S,SS.

SWK 593. Individual Study. 1-2 Credits.
Variable topics in social work related areas carried out individually or in small groups under the supervision of the instructor. Repeatable for a maximum of 4 credits. Prerequisite: Consent of instructor. Repeatable to 4 credits.

SWK 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

SWK 997. Independent Study. 2 Credits.

SWK 998. Thesis. 2-4 Credits.
Total of 4 credits required in thesis option. Repeatable to 4 credits.

Master of Social Work

Admission Requirements for the M.S.W. Foundation Program
(For students without a B.S.W.)
The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog. Applicants for the Foundation courses (offered only through the part-time Distance Program for students without a BSW) must meet the following standards:

1. Satisfactory completion of a bachelor’s degree from an accredited institution.
2. At least 30 credit hours of liberal arts courses in such fields as biology, music, languages, anthropology, economics, political science, history, literature, sociology, psychology, and philosophy.
3. A grade of C or higher in a statistics course prior to entering the Advanced Generalist Concentration portion of the MSW program.
4. Willingness to abide by the National Association of Social Worker’s Code of Ethics and the University of North Dakota Code of Student Life.
5. An undergraduate GPA of 3.00 overall or a GPA of 3.00 in the last two years of the undergraduate program.
6. Meet the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

Admission Requirements for the M.S.W. Concentration Program
(For students with a B.S.W.)
Applicants for the Concentration courses must meet the following standards:

1. BSW from a CSWE accredited program.
2. An undergraduate GPA of 3.00 overall or a GPA of 3.00 in the last two years of the undergraduate program.
3. A grade of C or higher in a statistics course.
4. Willingness to abide by the National Association of Social Worker’s Code of Ethics and the University of North Dakota Code of Student Conduct.
5. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.
6. Students who have received a bachelor’s degree or higher from the United States or English-speaking Canada are not required to submit the TOEFL.

Admission Schedule

- Campus Program: Annual application deadline is January 15. Classes begin the following Fall Semester (August).
- Distance MSW Foundation Courses: Applicants without a BSW must apply for Foundation courses. Annual application deadline is June 15. Classes begin the following Spring Semester (January).
- Distance Program Concentration Courses: Applicants with a BSW are considered “Advanced Standing” applicants and apply for Concentration
Degree Requirements

(For Students with a B.S.W.)

Students seeking the Master degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Social Work Department. Credit is not granted for life or work experience.

Degree Requirements for Students Completing Both Foundation and Concentration Courses:

1. Successful completion of 60 credit hours of courses approved by the social work faculty with at least a 3.00 grade point average. The number of electives required is dependent on whether a student selects the independent study or the thesis option.
2. Satisfactory completion of Foundation courses (24 credit hours).
3. Satisfactory completion of the Advanced Generalist Concentration courses (36 credit hours).
4. Completion of the research capstone, SWK 997 Independent Study (2 credits), or SWK 998 Thesis (4 credits).
5. Completion of at least 52 semester credits at UND. A maximum of 8 credits will be allowed for transfer.
6. The development of a program of study in the semester in which the full-time student first enrolls in concentration courses, or the second semester in which the part-time student enrolls in concentration courses.

Degree Requirements

(For Students without a B.S.W.)

Students seeking the Master degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Social Work Department. Credit is not granted for life or work experience.

Degree Requirements for Students Completing Both Foundation and Concentration Courses:

1. Successful completion of 60 credit hours of courses approved by the social work faculty with at least a 3.00 grade point average. The number of electives required is dependent on whether a student selects the independent study or the thesis option.
2. Satisfactory completion of Foundation courses (24 credit hours).
3. Satisfactory completion of the Advanced Generalist Concentration courses (36 credit hours).
4. Completion of the research capstone, SWK 997 Independent Study (2 credits), or SWK 998 Thesis (4 credits).
5. Completion of at least 52 semester credits at UND. A maximum of 8 credits will be allowed for transfer.
6. The development of a program of study in the semester in which the full-time student first enrolls in concentration courses, or the second semester in which the part-time student enrolls in concentration courses.

Degree Requirements

(For Students with a B.S.W.)

1. Successful completion of 36 credit hours of courses approved by the social work faculty with at least a 3.00 grade point average. Students who complete SWK 997 Independent Study must complete 5 elective credit hours; students who choose to complete SWK 998 Thesis must take 3 elective credit hours.
2. Satisfactory completion of the Advanced Generalist Concentration core courses listed below:

<table>
<thead>
<tr>
<th>Concentration Courses</th>
<th>SWK 527</th>
<th>Advanced Generalist Human Behavior and the Social Environment I</th>
<th>2</th>
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<tbody>
<tr>
<td></td>
<td>SWK 528</td>
<td>Advanced Generalist Human Behavior and the Social Environment II</td>
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<td>SWK 529</td>
<td>Advanced Generalist Research Methods and Analysis</td>
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<td>SWK 530</td>
<td>Advanced Generalist Practice with Individuals</td>
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<td>SWK 533</td>
<td>Advanced Generalist Practice with Families</td>
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<td>SWK 534</td>
<td>Advanced Generalist Practice with Treatment Groups</td>
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<td>SWK 535</td>
<td>Advanced Generalist Practice with Communities</td>
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<td>SWK 537</td>
<td>Advanced Generalist Tools for Policy</td>
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<td>SWK 580</td>
<td>Advanced Generalist Practice Field Education I</td>
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<td>SWK 581</td>
<td>Advanced Generalist Practice Field Education Seminar I</td>
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<td>SWK 582</td>
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<td>Electives</td>
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<td>Total Credits</td>
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<td>32-34</td>
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</tbody>
</table>

3. Completion of the research capstone, SWK 997 Independent Study (2 credits), or SWK 998 Thesis (4 credits).

M.A. in Sociology (p. 544)

Courses

SOC 500. Professional Seminar. 1 Credit.
The course is intended as an introduction to graduate studies, the university and to the opportunities in the discipline of Sociology. Prerequisite: Admission to the graduate program in Sociology. S/U grading.

SOC 510. Sociological Inquiry. 3 Credits.
This course focuses on the processes by which sociologists perceive, understand, and study social phenomena.

SOC 511. Contemporary Sociological Theory. 3 Credits.
An examination and comparison of the major current sociological theories.

SOC 512. Advanced Sociological Theory. 3 Credits.
Advanced overview of topics in the field of sociological theory. Prerequisite: SOC 511 or consent of instructor. On demand.

SOC 520. Advanced Research Design. 3 Credits.
This course emphasizes the development of research design skills including survey research. Prerequisites: SOC 323 and SOC 326. S.

SOC 521. Advanced Statistical Methods. 3 Credits.
An in-depth examination and application of the following topics as they relate to survey research in sociology: data processing; quantification and analysis of data; analytical statistical design; and procedures. The student will apply the various analytical statistical methods to available data. Prerequisites: SOC 323, SOC 326, and SOC 520. F.

SOC 528. Seminar in Research Methods. 3 Credits.
An examination of special topics in the field of research methods. Prerequisite: SOC 323. Repeatable to 6 credits. On demand.
SOC 537. Graduate Cooperative Education. 3 Credits.
A practical work experience with an employer closely associated with the student's cognate area. Prerequisite: Program of study committee and Director of Graduate Studies approval is required. S/U grading.

SOC 538. Seminar in Social Problems. 3 Credits.
An examination of special topics with a focus on social problems and potential solutions. Prerequisite: Admission to the graduate school or consent of instructor. F, odd years.

SOC 539. Seminar in Sociology. 3 Credits.
An in-depth examination of a particular sub-field in Sociology. Prerequisite: Admission to the Graduate School or permission of instructor. Repeatable to 6 credits. On demand.

SOC 540. Seminar in Social Policy. 3 Credits.
An examination of special topics with a focus on social policy. Prerequisite: Admission to the graduate school or consent of instructor. F, even years.

SOC 569. Introduction to Social Entrepreneurship. 3 Credits.
The purpose of this course is to introduce students to the topics of social entrepreneurship, social entrepreneurs, how social entrepreneurship can become a tool for social change, social science theories and research on social entrepreneurship. Prerequisite: Admission to the Certificate Program in Social Entrepreneurship. S.

SOC 592. Research Experience in Sociology. 1-5 Credits.
Designed for students who are working on research under the direction of one or more faculty. This course provides the opportunity for guided experience in applied research projects. Prerequisite: Consent of instructor. Repeatable to 5 credits. S/U grading. S.

SOC 594. Readings in Sociology. 1-5 Credits.
Designed for students who want additional instruction in sociological topics. Specific arrangements must be made with the instructor prior to registration. Prerequisite: Consent of instructor. Repeatable to 5 credits. F.S.

SOC 599. Internship in Sociology. 1-5 Credits.
A learning experience in a selected community agency or organization determined by the student's area of interest. The student will select a Sociology professor to oversee the internship, and it is with this professor that the student will complete a contract for the course prior to enrolling. Fieldwork is under the supervision of agency personnel. Two to three hours per week are required in the field per credit hour for each week of the semester. Prerequisite: Consent of instructor. Repeatable to 5 credits. S/U grading. F.S.

SOC 996. Continuing Enrollment. 1-12 Credits.
Repeatable, S/U grading.

SOC 998. Thesis. 1-9 Credits.
Maximum of 9 credits. Repeatable to 9 credits.

Undergraduate Courses for Graduate Credit
SOC 407. Political Sociology. 3 Credits.
Sociological analysis of political and parapolitical groups; voting behavior; political socialization process; power elites, societies and systems of government; power structures. On demand.

SOC 431. Workplace Dynamics. 3 Credits.
This course focuses on understanding contemporary workplace dynamics, informed by how the organization of work has changed across time. Theories underlying the organization of work are examined, with an emphasis on how workplaces are shaped by larger social forces, how they shape society, and how they intersect with other organizations. The course concludes with an exploration of diversity in the workforce, especially the ramifications of social class, gender, and race/ethnicity in organizational settings. On demand.

SOC 435. Racial and Ethnic Relations. 3 Credits.
A survey of major USA racial and ethnic groups, the histories of their social encounters, and the theoretical perspectives associated with their experiences. On demand.

SOC 436. Social Inequality. 3 Credits.

SOC 437. Population. 3 Credits.
A basic consideration of formal and social demography. The determinants and consequences of population change. On demand.

SOC 450. Deviant Behavior. 3 Credits.
This course examines the nature, types and societal reactions to deviant behavior; special emphasis on the process of social typing, regulation of deviance, deviant subcultures, and identities. On demand.

SOC 492. Research Experience in Sociology. 1-5 Credits.
Students enrolled in this practicum work on a research project under the direction of one or more faculty. The practicum is designed to provide hands-on research and/or statistical experience for those enrolled. Repeatable for a maximum of 10 credits. Repeatable to 10 credits. S/U grading. F.S.

SOC 494. Readings in Sociology. 1-5 Credits.
Designed for students who want instruction in subjects not covered adequately in usual course offerings. Specific arrangements must be made with the instructor prior to registration. Prerequisite: Consent of instructor. Repeatable to 10 credits. F.S.

Master of Arts in Sociology
The Master of Arts in Sociology has been suspended and no new applications are being accepted at this time.

Admission Requirements
The applicant must meet the School of Graduate Studies' current minimum general admission requirements as published in the graduate catalog.

1. A four-year bachelor's degree from a recognized college or university.
2. A minimum of twenty semester hours of undergraduate sociology or related fields with an overall grade point average of 3.00 (A=4.0), a GPA of at least 3.25 for the last two years of undergraduate study; and 3.25 GPA in their major.
3. Satisfy the School of Graduate Studies' English Language Proficiency requirements as published in the graduate catalog.
4. Approved status presupposes some undergraduate training in methods of social research, statistics, and sociological theory and social psychology with a minimum grade of B in each.

Degree Requirements
Thesis Option:

1. A minimum of 30 semester credits in a sociology track, including the credits granted for the thesis and the research leading to the thesis.
2. At least one-half of the credits must be at or above the 500-level.
3. A maximum of one-fourth (usually 8-9 semester credits) of the credit hours required for the degree may be transferred from another institution.
4. Program work must include 7-9 credits in courses for a chosen sociology track, including approved courses from other designated university departments.
5. Program must include a systematic treatment of the field of sociological theory plus sufficient training in research methods and statistical techniques to assure understanding and competence in their use.
6. Required Courses (grade of "B" or better is required for all of the following):

<table>
<thead>
<tr>
<th>Course Code</th>
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<th>Credits</th>
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<tbody>
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<td>SOC 500</td>
<td>Professional Seminar</td>
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<tr>
<td>SOC 510</td>
<td>Sociological Inquiry</td>
<td>3</td>
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<tr>
<td>SOC 511</td>
<td>Contemporary Sociological Theory</td>
<td>3</td>
</tr>
<tr>
<td>SOC 520</td>
<td>Advanced Research Design</td>
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</tr>
<tr>
<td>SOC 521</td>
<td>Advanced Statistical Methods</td>
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Select two of the following:

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<td>Seminar in Social Policy</td>
</tr>
<tr>
<td>SOC 569</td>
<td>Introduction to Social Entrepreneurship</td>
</tr>
</tbody>
</table>

Selected Track:

General Track

7-9 credits of electives as determined by the student and their advisor
AVIT 505. Qualitative Research Methods. 3 Credits.
Examination and analysis of qualitative research design with particular emphasis on approaches relevant to problems in Aerospace Studies or related fields. Students will design a qualitative research project.

AVIT 506. Quantitative Research Methods. 3 Credits.
The purpose of this course is to provide students the opportunity to acquire knowledge and skills necessary to apply quantitative research methods in research. Students will design a quantitative research project. Prerequisite: A graduate level Statistics course.

AVIT 507. Advanced Research Methods. 3 Credits.
This course will be a thorough discussion of the different methodologies utilized in theoretical and applied research. Experimental and quasi-experimental design, and topical areas of survey methodology data mining, simulations, and techniques for dissertation designs. Prerequisites: AVIT 503, AVIT 505, and AVIT 506.

AVIT 508. Aviation Public Policy and Regulations. 3 Credits.
This course will examine and discuss the initiation, formulation and implementation of public policies that affect the various segments of the aviation industry. Various regulatory areas within the aviation industry, such as scheduled air carriers, general aviation, airport operations, air traffic management, and international agreements, will be analyzed. On demand.

AVIT 509. Aviation Information Technology. 3 Credits.
This course is an introduction to information systems essential to an aviation business professional. It will provide an overview of current and emerging technologies in various database, data communication and e-commerce systems.

AVIT 510. Aviation Environmental Issues. 3 Credits.
This course examines current environmental issues within the aviation industry in the context of historical environmentalism, current laws and regulations, and emerging research findings. A broad survey of earth systems precedes a focused examination of contemporary aviation environmental issues.

AVIT 511. Aviation Safety Management Systems. 3 Credits.
An in-depth study of aviation safety management concepts and principles as they relate to effective safety programs within the airlines, corporate aviation, general aviation and airports.

AVIT 512. Aviation Management Theory. 3 Credits.
An in-depth review of organizations in the aviation industry, their structures, environments and leadership as it relates to human behavior. Topics include organizational design, climate and the interactions with individuals, groups, and different organizational structures within the airline, general aviation, corporate aviation and airport organizations.

AVIT 513. Human Factors and Ergonomics: Human Perceptions in Information Systems Design. 3 Credits.
Human perception and information processing will be discussed in relation to information system design requirements to optimize human performance. The Ergonomics components will highlight human-centered design of equipment, devices and processes that conforms to the human body (anthropometry) and its cognitive abilities within the aviation/aerospace environment. Topics include information systems design with regard to compatibility, perception, attention, situation awareness and decision processes. Applications to current workstation design will allow students to have a greater understanding of human centered design goals. On demand.

AVIT 514. Training System Design. 3 Credits.
The process of memory, learning, and judgment will be related to instructional design strategies in the aviation industry, where heavy use of simulation is used in the training and evaluation of aviation professionals. Topics include instructional design and assessment concepts, simulation design and decision making skills. Class presentations include operational problem-solving group work as well as research paper reviews.
AVIT 517. Airline Labor Relations and Law. 3 Credits.
This course will examine and discuss the application and impact of the Railway Labor Act as it pertains to air carrier labor operations. Topics of study will include labor history, organization, alternative dispute resolution, collective bargaining, and emerging labor trends. On demand.

AVIT 518. Human Error. 3 Credits.
The objective of this course is to develop a deeper understanding of the human error and its impact upon human performance in variety of fields. Prerequisite: Graduate Admission. S.

AVIT 520. Strategic Airport Planning. 3 Credits.
This course will explore the elements of airport planning within the public administration domain. Emphasis will be placed on individual airport's strategic plans, how airports operate efficiently and effectively with changing regulations and economic fluctuations in the global marketplace.

AVIT 521. Ethics in Aerospace. 3 Credits.
The course will introduce ethical concepts and frameworks used in professional decision-making. Students will engage with faculty and outside speakers to weigh decisions in the applicable ethical frameworks. Students participation will include graded elements of formal case presentations, class discussion sessions, essay examinations and review of scholarly and trade journal articles. The course will have a strong emphasis on research project design to assess dynamics of ethical decision-making in different populations, and exploring educational opportunities in the aerospace industry.

AVIT 522. UAS Management. 3 Credits.
This course provides a series of lectures or presentations by visiting lecturers or faculty on various themes related to Unmanned Aircraft Systems (UAS). Prerequisite: Graduate Student Status. F, odd years.

AVIT 523. Aviation Safety Data Analysis. 3 Credits.
The objective of this course is to obtain an understanding of various safety programs conducted throughout the aviation industry and examine the underlying analytical techniques associated with each program. Prerequisite: Graduate student status. SS.

AVIT 524. Air Traffic Management. 3 Credits.
This course will explore the elements of Air Traffic and Next Gen. There will be a discussion on how air traffic control works and the evolution of the Air Traffic Management of the National Airspace System in the US and abroad. Emphasis will be on the current day issues and how Air Traffic Management is changing not only in the US but in Canada, Europe and worldwide. Prerequisite: Admission (or conditional admission) to the Aviation Master of Science, The Aerospace PhD program, or consent of the instructor. S, odd years.

AVIT 525. Legal Issues in Aviation. 3 Credits.
The course will introduce legal concepts and frameworks of the United States' legal system. Issues particular to the aviation industry will be discussed. Students will engage in formal case presentations and discussions to gain an understanding of the legal issues faced in the aerospace industry. Prerequisite: Admission (or conditional admission) to the Aviation Master of Science program, the Aerospace PhD program, or consent of the instructor. SS, even years.

AVIT 526. UAS and the Law. 3 Credits.
This course introduces students to the laws and policies governing UAS operations including flight regulations, remote sensing issues, and data and cybersecurity issues related to UAS. The class scope of inquiry includes US and international law and examines both civil and military use. On demand.

AVIT 587. Supervised Field Work. 1-3 Credits.
Used primarily for individualized field placement so that the student may acquire practical experiences in the aviation industry. Prerequisite: Consent of graduate director. Repeatable to 6 credits. S/U grading.

AVIT 590. Aviation Seminar. 1-3 Credits.
A series of lectures presented by visiting lecturers and the faculty. Repeatable to 9 credits.

AVIT 591. Readings in Aviation. 1-3 Credits.
Readings in selected Aerospace Studies topics, with written and/or oral reports. Prerequisite: Consent of instructor. Repeatable to 6 credits.

AVIT 593. Individual Research in Aviation. 1-3 Credits.
Individual student projects designed to develop advanced knowledge in a specific area of expertise. A written report is required. May be repeated for up to 6 credits for Master's and up to 12 credits for Ph.D. Repeatable to 6 credits.

AVIT 595. Aviation Capstone. 3 Credits.
The Capstone course integrates, extends and applies knowledge learned in earlier Aviation courses and research projects. The course also undertakes an in-depth study of management theories relevant to the aviation industry and how leaders apply these theories in practice. Students will have the opportunity to demonstrate their knowledge and leadership abilities by working in teams to design and develop a solution to a current aviation problem, which will be assigned by the instructor. This effort will culminate in an on-campus presentation to the faculty and invited industry experts. Prerequisite: AVIT 504 or permission of instructor.

AVIT 996. Continuing Enrollment. 1-12 Credits.
Repeatable. S/U grading.

AVIT 997. Independent Study. 2 Credits.
Independent study and preparation of a written report. Prerequisite: Special Permission Only. On demand.

AVIT 998. Thesis. 4 Credits.
Preparation and defense of a thesis based on original research. Prerequisite: Admission committee approval and consent of instructor. Repeatable to 4 credits.

AVIT 999. Dissertation. 1-12 Credits.
An original research project approved by and completed under the supervision of a dissertation committee. Prerequisites: Graduate standing, approval, completion, and defense of dissertation proposal. Repeatable to 18 credits.

SPST Courses

SPST 500. Introduction to Orbital Mechanics. 3 Credits.
This course introduces students without much background in either mathematics or physics to the problems faced everyday by orbital analysts as they track the 7000 satellites which orbit the earth. The course gives the students an ability to converse, as managers and co-workers, with those individuals who are calculating these difficult orbits. This appreciation is important in both the civilian and military sides of the space program. On demand.

SPST 501. Survey of Space Studies I. 3 Credits.
SPST 501 is the first course in a two-course sequence (along with SPST 502) in Space Studies that introduces new students to essential knowledge that will be necessary to successfully complete their M.S. degree in space studies. SPST 501 consists of the following six modules: 1) space history, 2) space policy, 3) space law, 4) planetary and space sciences, 5) space life sciences and human factors, and 6) Earth remote sensing. All modules contain foundational information that will give students the basic knowledge and skills necessary to achieve a broad understanding of the multi- and interdisciplinary nature of space studies; knowledge that can be applied in later courses, such as Capstone; and knowledge that facilitates thesis and other specialized types of instruction and research. Course content in SPST 501 will also be used to assess student learning at the end of their M.S. program via the Comprehensive Examination. Students are expected to master and understand course content, be able to apply course content as appropriate, and demonstrate their understanding of course content prior to graduation. F.

SPST 502. Survey of Space Studies II. 3 Credits.
SPST 502 is the second course in a two-course sequence (along with SPST 501) in Space Studies that introduces new students to essential knowledge that will be necessary to successfully complete their M.S. degree in space studies. SPST 502 consists of the following five modules: 1) space mission design (two modules), 2) orbital mechanics, 3) launch vehicles and propulsion, and 4) robotic spacecraft instrumentation. All modules contain foundational information that will give students the basic knowledge and skills necessary to achieve a broad understanding of the multi- and interdisciplinary nature of space studies; knowledge that can be applied in later courses, such as Capstone; and knowledge that facilitates thesis and other specialized types of instruction and research. Course content in SPST 502 will also be used to assess student learning at the end of their M.S. program via the Comprehensive Examination. Students are expected to master and understand course content, be able to apply course content as appropriate, and demonstrate their understanding of course content prior to graduation. S.
SPST 504. Research Methods in Space Studies. 3 Credits.
This course will provide an introduction to research in Space Studies emphasizing the preparation of a Ph.D. proposal and the dissertation itself. Course content will be tailored to address the specific research methods applicable to the student(s) research interests. Typically given by the student's advisor, but students preparing in the same area (e.g., Planetary Science, Astronomy) may be in a combined section. On demand.

SPST 505. Spacecraft Systems Engineering. 3 Credits.
This course will guide the students through the spacecraft design and proposal process for an actual mission. In this course the students will work in teams on individual spacecraft subsystems, participate in an engineering design review, and create a document which can be submitted for funding for a small satellite project. Lectures will provide an overview of the separate spacecraft subsystems involved in a typical mission, the systems engineering approach to spacecraft development, and the grant writing process. Distance students will interact with on-campus students via conferencing software. Prerequisite: SPST 405 or consent of instructor.

SPST 506. Advanced Orbital Mechanics. 3 Credits.
This course provides a working knowledge of the field of orbital mechanics including the use of appropriate mathematical and computational techniques, the analysis of professional papers in orbital mechanics, and applying the appropriate techniques to solve orbital mechanics problems. Topics covered include orbital elements, perturbations, coordinate systems, orbit determination, and multi-body gravitational problems. Prerequisites: SPST 500, and MATH 266 or equivalent.

SPST 508. Quality Engineering for the Space Industry. 3 Credits.
This course addresses the principles and techniques for establishing quality goals, identification of customer needs and requirements, measurement of quality, and product/process engineering to improve system performance with a focus on the space industry. The main objectives are to provide the student with an understanding of the principles and practice of quality and reliability engineering in general and to provide an in-depth understanding of the quality assurance concepts, strategies, and tools practiced in the space industry. Familiarity with the techniques learned in this course will enable the student to address problems in the design, implementation, measurement, and correction of production and service systems found in the space industry. On demand.

SPST 512. Human Performance in Extreme Environments. 3 Credits.
This course identifies the impact that the stressors of extreme environments have on human performance. The course objectives are to highlight the differences and similarities among extreme environments and to demonstrate that, despite the differences learned from operations in a given extreme environment can be effectively applied to other environments. Although settings such as space, mountains, or deep sea exhibit unique characteristics, the human physiological and psychological reactions and adaptations to these extreme settings stay similar. On demand.

SPST 515. Human Factors in Space. 3 Credits.
This course is a review of the major stresses experienced by humans on entering the space environment. The course objectives include investigation of the psychological and physiological effects experienced by U.S. and Russian space crews, with an emphasis on longer flights. The examination of the avoidance and mitigation of these stresses is an essential need in the future development of human spaceflight. On demand.

SPST 517. Human Spaceflight Systems. 3 Credits.
This course is designed to introduce students to human space systems. The course uses both an engineering and a historical approach to human spaceflight systems covering all manned spacecraft up to today, plus individual subsystems necessary for human occupation. By the end of the course, students will: 1. Understand the engineering and science concepts related to human spaceflight, 2. Understand the major technologies required for human spaceflight, 3. Apply the systems engineering process to a human spaceflight mission: a. Describe the interactions among the elements of a space mission, b. Describe the interactions among all spacecraft subsystems, c. Document design decisions and analysis in a clear and concise manner. F, even years.

SPST 519. Closed Ecological Systems for Life Support. 3 Credits.
The course covers the multiple interactions of human/bioregenerative life support based on physical/chemical regeneration (hybrid) life support environments. The course devotes specific attention to the limits of stability for closed material cycles functioning during long-term remote confined missions. The importance of the human factor as a target link, main sensor, and main integration and control element for the system is considered as providing significant self-sustainability. Advanced scenarios for space life support based on ecological and in situ resource utilization approaches are discussed. On demand.

SPST 520. Asteroids, Meteorites and Comets. 3 Credits.
The small bodies of the solar system provide clues to the origin and early history of the solar system. The planets and larger moons have all been chemically transformed erasing their records of their formation. By contrast, many asteroids, meteorites and comets are essentially unmodified from the time of their origin. 4.5 billion years ago and thus preserve a record of the formation epoch. Each of these classes of objects is investigated separately, and relationships between them are examined. Implications for impact hazards and for extraterrestrial resources are also explored. The results of recent and current spacecraft missions to asteroids (e.g., Galileo, NEAR, DAWN, Hayabusa, Rosetta, OSIRIS-Rex, etc.) and to comets (e.g. Giotto, Vesta 1, Stardust, Deep Impact, Rosetta, etc.) are reviewed. On demand.

SPST 521. The Planet Mars. 3 Credits.
This course provides an in-depth review of the present state of our knowledge of the planet Mars. Topics that are covered include: the origin and evolution of the planet, the surface geology and geological processes, the geophysical properties of the Martian interior, the origin and evolution of the Martian atmosphere, the present and past climates of Mars, the Martian moons, and the possibility of past or present life on Mars. The American, Soviet/Russian and other nations’ Mars exploration programs are reviewed and the course incorporates the most recent results from spacecraft missions such as Mars Odyssey, the Mars Exploration Rovers (Opportunity Spirit), Mars Express (European Space Agency), Mars Reconnaissance Orbiter, Mars Science Laboratory (Curiosity Rover), MAVEN, and Mangalyaan (India’s Mars Orbiter Mission). Potential future manned and unmanned missions are also discussed. On demand.

SPST 522. Remote Sensing Principles. 3 Credits.
This course covers the basic concepts and foundations of remote sensing, a review of major Earth observing satellite and aircraft platforms, and an investigation of flow of data from satellite to Earth, what it represents, and how to interpret it, using both visual and digital image processing techniques. A field visit to the EROS Data Center in Sioux Falls may also be arranged.

SPST 523. Remote Sensing Applications. 3 Credits.
This course covers the use of advanced image processing algorithms and information extraction techniques for various Earth resource applications such as land cover/land use, environmental change detection, geology, oceanography, agriculture, forestry, rangeland, water resources, urban planning, natural disaster management, etc. Prerequisite: SPST 522.

SPST 524. Current Topics in Astrobiology. 3 Credits.
This is a multi-disciplinary, literature-intensive examination of astrobiology, which is the study of life in the universe. Students will read scientific research and review papers from a variety of disciplines including astronomy, planetary science, chemistry, biology, and geology. Course goals include: developing proficiency at reading/analyzing diverse scientific papers, developing the ability to incorporate knowledge from multiple disciplines in the study of astrobiological research, and developing the ability to effectively write summary papers to show basic understanding of course material. Prerequisite: SPST 460 or consent of instructor. On demand.

SPST 525. Technical Issues in Space. 1-3 Credits.
An examination of the technological base for the exploration and development of space. An understanding of this technology and of its impact is essential to an understanding of the issues and problems associated with our continuing efforts to explore and settle this new frontier. May be repeated if the topic is different. Repeatable.
SPST 526. Advanced Observational Astronomy. 3 Credits. An advanced course that utilizes UND Observatory's full wavelength range capabilities to obtain data from a variety of celestial objects with the key goal of learning appropriate ways to reduce and interpret observational data. In particular, the course will focus on visible-wavelength stellar spectroscopy, near-infrared reflectance spectroscopy, solar astronomy, radio astronomy, and color imaging. Students will also engage in reading professional literature for each class-discipline and prepare a mock publication using data obtained during the course. Learning outcomes and objectives for this course include: 1) Students will be able to locate and observe astronomical objects and reduce data, 2) Develop analytical skills and the ability to interpret observational data, 3) Gain experience with measurement techniques and equipment, and develop the ability to assess uncertainties and assumptions, 4) Communicate professionally, in writing, the results of their observational endeavors, and be able to understand scientific ideas by reading published professional journal articles, 5) Students will be able to understand scientific ethical practices and demonstrate them in the conduct of scientific research, and 6) Students will be able to conduct astronomical research under the direction of the professor, which will ultimately contribute to the generation of new knowledge as it will prepare them to do this professionally. Prerequisites: SPST 425 and MATH 165 or consent of instructor. On demand.

SPST 527. Extraterrestrial Resources. 3 Credits. This course focuses on the inventory, access, acquisition, processing and utilization of extraterrestrial resources (space resources) from celestial bodies such as the Moon, Mars, asteroids and comets. Consideration will be given to extraterrestrial resources for in situ utilization (such as a Lunar or Martian base), for space operations (such as supporting large scale near-Earth activities or a human Mars mission), and for terrestrial markets. The course will focus on the interplay between the scientific, technical, and economic aspects of acquiring and utilizing such resources. The course will also explore some of the legal and political ramifications and limitations of claiming and recovering space resources. On demand.

SPST 528. Space Environment and the Sun. 3 Credits. This course will provide an in-depth study of the science and observations of the Sun, space weather, and effects of the Sun on astronauts, Earth, and the space environment. Topics that will be covered include the solar photosphere and active surface phenomena such as sunspots, flares, and coronal mass ejections; the nature of the quiet Sun; the solar interior and helioseismology; space weather and impact of solar particles on the space environment and Earth; the hazards posed to astronauts by solar eruptions; common techniques of solar observations; and a review of the primary types of solar instrumentation and the observatories that currently study the Sun. Students will be able to observe the Sun using the UND Observatory's small solar telescopes; all students will have the opportunity to analyze solar datasets to aid their understanding of the Sun. Prerequisite: MATH 165 or consent of instructor. On demand.

SPST 540. Space Economics and Commerce. 3 Credits. A study of the economic aspects of space activities, with analysis of the possibilities and the barriers. Key areas include launch services, satellite communications, remote sensing, microgravity materials processing, and interaction with the government. Global competition against subsidies or government-sponsored entities is examined. On demand.

SPST 541. Management of Space Enterprises. 3 Credits. This course investigates the management of space organizations. These include organizations that are public and private, RD and operations, profit and non-profit. You will learn the basics of management theory, the history of systems management, and the technical issues that must be considered in the management of space RD and operations. On demand.

SPST 542. Risk Management of Space Organizations. 3 Credits. This course includes a systematic approach to the principles and practices of risk management in the space industry from project initiation through planning, implementation, control and closeout. It discusses various techniques and models for qualitative and quantitative risk assessment and risk mitigation in such areas as cost, schedule, and performance. Decision making under conditions of uncertainty and risk is also discussed. On demand.

SPST 545. Space and the Environment. 3 Credits. This course is an advanced graduate-level review of international relations theories, policies, and laws as applied to the international implications of global commons. This course introduces the concept of global commons, examines the theories and practices concerning management of global commons, and analyzes the global commons dealing with the challenges of collective action as applied to global, orbital, and planetary environmental changes. On demand.

SPST 551. History of the Space Age. 3 Credits. This course introduces students to the history of human endeavors in space. These include the development of rocketry, the influence of amateur societies and science fiction, the military development of ballistic missiles, and human and robotic spacecraft. On demand.

SPST 552. History of Astronomy and Cosmology. 3 Credits. This course investigates the history of human endeavors to understand the stars, planets, and cosmos as a whole from a scientific perspective. It covers the early observations and theories of the Babylonians and Greeks through the European Scientific Revolution, and finally to the development of astrophysics and modern cosmology using space vehicles. On demand.

SPST 555. Military Space Programs. 3 Credits. An introduction to military uses of space by the United States, Russia, and other nations. The course introduces ballistic missiles, anti-ballistic missile and anti-satellite systems, space-based reconnaissance and intelligence-gathering, communications, navigation, acquisition, and military space treaties. On demand.

SPST 560. Space Politics and Policy. 3 Credits. This course serves as a graduate-level introduction to the field of Public Policy as applied to Space Policy. The course surveys the evolution of Space Policy at several levels of analysis including context, political actors and institutions, political processes, and policy outcomes, and assesses the symbiotic relationship between policy, technology, and science. On demand.

SPST 561. Public Administration of Space Technology. 3 Credits. This course is an advanced graduate-level review of Public Administration theories as applied to the implementation of space technology programs. In this course, the political, organizational, and technical variables that affect the management processes of space organizations are examined. Prerequisite: SPST 560 or SPST 541. On demand.

SPST 565. Space Law. 3 Credits. This course serves as a graduate-level introduction to the field of Law as applied to Space Law. The course examines the origins and evolution of the laws of outer space from the beginnings of the space age to the present. International laws governing access and use of space, and national laws regulating governmental and commercial activities in space are reviewed and analyzed. On demand.

SPST 570. Advanced Topics in Space Studies. 1-3 Credits. Lecture, discussion and readings on advanced topics of current interest. May be repeated if the topic is different. Repeatable.

SPST 574. Remote Sensing in Developing Countries. 3 Credits. This course will introduce students to remote sensing programs in developing countries and typical remote sensing application areas pertinent to developing countries, such as: potable water, forest fires, vector diseases, environmental degradation, food security, fisheries, floods, droughts, crop pests, etc., with case studies. Prerequisite: SPST 522 or GEOG 475 or consent of instructor. On demand.

SPST 575. Remote Sensing Law and Policy. 3 Credits. This course focuses on the evolving laws, policies, and institutions that have long-term ramifications for earth observations. Some topics addressed are the United Nations Principles on Remote Sensing, the U.S. Land Remote Sensing Policy Act of 1992, the commercialization of remote sensing activities, as well as manned and unmanned aerial remote sensing systems and their intersection with criminal and civil law. The course will also analyze current and developing remote sensing law, regulations, and technological capabilities, and their implications for both legal and cultural conceptualizations of privacy. At the U.S. domestic level, this will involve 4th Amendment jurisprudence, privacy laws, and case law. On demand.

SPST 581. Field Visit to Space Centers. 1-3 Credits. This course will provide a first-hand knowledge of selected space centers in the U.S. and/or abroad through an organized field visit. The field visit will be led by a space studies faculty and will include prior preparation through readings, class seminars, lectures and written assignments. May be repeated up to a maximum of 3 credits. Repeatable to 3 credits. S/U grading. On demand.

SPST 590. Space Studies Colloquium. 1 Credit. A series of lectures presented by visiting lecturers and faculty. May be repeated for up to 2 credits. S/U grading.

SPST 591. Readings in Space Studies. 1-3 Credits. Readings in selected Space Studies topics, with written and/or oral reports. Repeatable to a maximum of 6 credits. Prerequisite: Consent of instructor. Repeatable to 6 credits.
SPST 593. Individual Research in Space Studies. 1-3 Credits.
Individual student projects designed to develop advanced knowledge in a
specific area of expertise. A written report is required. May be repeated for up
to 6 credits for Master's and up to 12 credits for Ph.D. Repeatable to 6 credits.

SPST 595. Space Studies Capstone. 3 Credits.
The capstone course integrates, extends and applies knowledge gained
in earlier Space Studies courses and reading. The major component of
this course is a collaborative team project inter-relating policy, technology
and science. This course is required for students who select the non-thesis
option and can be taken after completing at least 25 credits in the program
or completion of the curriculum breadth requirements. The course concludes
with a required week-long capstone experience on the UND campus in the
spring. Prerequisites: SPST 501, SPST 502, SPST 997, Comprehensive
Exam, Graduate school status, and a GPA of 3.0 or higher. Prerequisite or
Corequisite: Will graduate in the calendar year; either in Spring, Summer, or
Fall semesters. F.

SPST 996. Continuing Enrollment. 1-12 Credits.
Prerequisite: Department consent. Repeatable. S/U grading.

SPST 997. Independent Study Report. 2 Credits.
Independent study and preparation of a written report for students taking the
non-thesis option in the Master's program.

SPST 998. Thesis. 1-6 Credits.
An original research project approved by and completed under the supervision
of a thesis committee. Prerequisites: Graduate standing in Space Studies and
completion and approval of a thesis proposal (see department for approval).
Repeatable to 6 credits.

SPST 999. Dissertation. 1-12 Credits.
An original research project approved by and completed under the supervision
of a dissertation committee. Prerequisites: Graduate standing, approval,
completion, and defense of dissertation proposal. Repeatable to 18 credits.
F,S,SS.

Undergraduate Courses for Graduate Credit

SPST 405. Space Mission Design. 3 Credits.
A team design project to develop the requirements for a space mission. The
specific mission will vary from time to time. Design teams will work on selected
portions of the mission. Accompanying lectures will provide background
material. Prerequisite: SPST 200. S.

SPST 410. Life Support Systems. 3 Credits.
A review of the physiological effects of living in space including a discussion
of current and near-term life support systems equipment for the provision of
oxygen, water, food, and radiation protection. In addition, a review will be made
of the issues associated with the development of fully closed ecological life-
support systems that will be essential to the long-term development of space.
Prerequisite: SPST 200. On demand.

SPST 425. Observational Astronomy. 3 Credits.
This course explores aspects of observational astronomy including
monochromatic imaging, astrometry, and photometry. Basic observing
techniques, astronomical equipment, characteristics of the night sky, data
reduction, interpretations, as well as image processing techniques will be
taught. Students will learn to operate a remotely controllable Internet telescope
and CCD camera. A broadband Internet connection is recommended. Night
observing is required. Prerequisite: PHYS 110. S.

SPST 450. International Space Programs. 3 Credits.
This course will introduce students to the major governmental space programs
around the world. The history, activities and future directions of the Russian/
Soviet, European/ESA, Chinese, Japanese, Indian and other space programs
will be explored. International collaborations between the various programs will
also be studied. Prerequisite: SPST 200. On demand.

SPST 460. Life in the Universe. 3 Credits.
This course examines the nature and evolution of life on Earth from its origin to
the present time in the context of cosmological evolution, chemical evolution,
planetary evolution, biological evolution, and cultural evolution. The possibility
of life elsewhere in the universe is considered based on the conditions under
which life could arise and flourish. Human changes to the Earth are placed
within this context. The future of life on Earth is discussed and the social and
cultural implications arising from the discovery of extraterrestrial life are
explored. On demand.

Cognate/Minor in Space Studies

The Department of Space Studies invites students from other programs who
wish to expand their program of study to include a space-related focus. Our
program includes a multidisciplinary set of course offerings that integrate well
with other graduate programs. Students interested in space engineering, space
business, space law, space policy, space science, space life sciences, space
history, or military space can be accommodated. To complete a cognate or
minor at the master's level, students must take three courses for nine semester
hours of credit. Our department will work with those doctoral students whose
department requires additional credits for a minor degree.

Master of Science in Space Studies

Admission Requirements

The applicant must meet the School of Graduate Studies’ current minimum
general admission requirements as published in the graduate catalog. The
deadlines for applying for admission for each semester are as follows: April 30
for the Fall semester; October 31 for the Spring semester; and February 28
for the Summer semester. Students who apply after these dates for a given
semester are encouraged to do so under non-degree status. The requirements
for admission to the Space Studies degree program are as follows:

1. Bachelor's degree from an accredited college or university with an overall
   grade point average (GPA) of 3.00 or better.
2. Three credits of coursework in statistics or algebra or calculus or computer
   science.
3. Six credits of coursework in the physical sciences, life sciences, or
   engineering.
4. Six credits of coursework in the social sciences, history, business, or law.
5. Three credits of coursework in English composition or technical writing.
6. Pre-requisite courses from 2 to 5 above must have been completed at the
college level, preferably with a grade of B or higher.
7. The Graduate Record Examination (GRE) General Exam if you plan on
   seeking funding (GRAs, tuition waivers) via the department or a faculty
   member. Otherwise, it is not required for admission to the MS program.
8. Submission of a written statement of interest highlighting the candidate's
   interest in space studies and motivation to undertake this program.
9. Satisfy the School of Graduate Studies’ English Language Proficiency
   requirements as published in the graduate catalog.

Financial Assistance

Graduate assistantships (GTA/GRA) are available from a variety of internal
and external sources. These are awarded on the basis of academic merit
and students' abilities to contribute to departmental research and teaching.
Students desiring graduate assistantships must take the GRE. The deadlines
for applying for financial aid through the Department of Space Studies for a
given semester are as follows: April 30 for the Fall semester; October 31 for
Spring semester; and February 28 for Summer semester. Funding is renewable
if progress toward the degree, research goals and teaching are satisfactory.
Support is typically for two years on a nine-month basis. Summer funding may
also be available.

Degree Requirements

All students are required to complete a minimum of 33 credits. The following
plan should be used:

1. SPST 501 Survey of Space Studies I and SPST 502 Survey of Space
   Studies II (6 credits).
2. Students select either the non-thesis or thesis option and declare which
   social or technical area is their area of specialization. This is the area in
   which they do their SPST 997 Independent Study Report or SPST 998
   Thesis.
3. Two (2) courses from designated social area courses outside the student’s
   area of specialization (6 credits).
4. Two (2) courses from designated technical area courses outside the
   student's area of specialization (6 credits).
Note: The choice of courses in the required social and technical areas outside the student’s area of specialization must take into account the breadth of disciplines, which is a critical part of Space Studies education. In order to meet the breadth requirements within the degree options, students are required to spread their courses as per guidelines outlined in the Department of Space Studies Graduate Student Handbook.

5. One credit of SPST 590 Space Studies Colloquium (1 credit).
6. At least half of the total credit hours must be from classes at the 500-level and above.
7. Comprehensive Examination: Stages 1 and 2.

Note: Stages 1 and 2 are completed at the conclusion of SPST 501 and SPST 502, respectively. The comprehensive exam process should demonstrate the student’s core knowledge and integrative skills.

Non-Thesis Option:
1. SPST 997 Independent Study Report (2 credits).
2. Comprehensive Examination: Stage 3.

Note: Stage 3 requires the student to apply principles and methodologies, and understanding of the interplay between different, often competing, disciplines. The student must show that information from Space Studies courses can be used to assess and analyze a broadly cross-disciplinary issue. Stage 3 can be taken during either the fall or the spring semester.

1. At least 3 elective courses.
2. Completion of SPST 595 Space Studies Capstone (3 credits).

Thesis Option:
1. SPST 593 Individual Research in Space Studies (1 to 3 credits).
2. SPST 998 Thesis (6 credits).
3. At least 2 elective courses.
4. Submission of the thesis, or an article derived therefrom, to a peer-reviewed journal.

Approval of the thesis option will only be granted if a clear alignment of research interests between a faculty member and a student is demonstrated, and a faculty adviser has been identified and is available to supervise the research. Distance students who wish to complete the thesis option must satisfy the residence requirement. Interested students should consult the School of Graduate Studies or department.

Theatre Arts

Courses
THEA 997. Independent Study. 2 Credits.
THEA 998. Thesis. 1-6 Credits.
Repeatable to 6 credits.

Undergraduate Courses for Graduate Credit
THEA 339. Production Design. 3 Credits.
Exploration of needs for putting together a successful theatrical production. Topics include conceptual work, drafting, model-making and rendering, and scenic painting. Prerequisites: THEA 270 and THEA 300 or consent of instructor. Repeatable to 6 credits. F.

THEA 404. Acting for the Music Theatre. 3 Credits.
Appreciation of and performance techniques for musical theatre including: voice and movement work, acting, and staging. Prerequisite: Consent of instructor. S.

THEA 415. Selected Problems in Theatre Arts. 1-3 Credits.
Topics of special interest to faculty and students, such as Theatre Management, Women's Issues in Drama, Polish Theatre and Drama, Improvisation, Scene Painting, and others. Repeatable up to 9 credits. Repeatable to 9 credits. On demand.

THEA 423. History of the Theatre: Classical, Medieval and Renaissance. 3 Credits.
The theatre in performance. The origins of theatrical forms and their relationships to acting style, physical theatre and audience with the cultural environment. F, even years.

THEA 424. History of the Theatre: Seventeenth Century to the Present. 3 Credits.
A continuation of topics covered in THEA 423 beginning with the Seventeenth Century and continuing to the present. Student need not take THEA 423 prior to enrolling in THEA 424. S, odd years.

THEA 425. Play Direction II. 3 Credits.
A continuation of THEA 300 with emphasis on contemporary theories, analysis, research, conceptualization, and implementation. Laboratory experience. Prerequisite: THEA 300 or consent of instructor. S. even years.

THEA 426. Scene Design for the Stage. 3 Credits.
The analysis, research, and conceptualization of the physical context of theatre productions. Emphasis on individual creative projects. Repeatable up to 6 hours. Prerequisite: THEA 270. Repeatable to 6 credits. F.

THEA 427. Costume Design. 3 Credits.
Elements, principles, and styles of design applied to the visual creation of a dramatic character. Repeatable up to 6 credits. Prerequisites: THEA 260 or consent of instructor. Repeatable to 6 credits. S. even years.

THEA 471. Advanced Acting III: Shakespeare. 3 Credits.

THEA 488. Playwriting. 3 Credits.
The playwright’s problems as revealed through practice of writing plays; experimental productions of the student’s creative work whenever possible. Repeatable up to 6 hours. Prerequisite: THEA 260 or consent of instructor. Repeatable to 6 credits. F.

University Courses

UNIV 529. Study Abroad.
1 to 12 credit equivalents in any one semester (repeatable with permission of the student's academic department); course required of students studying abroad to maintain full-time status; required prior approval from Graduate School; prior to registration, students will be involved in study abroad procedures inclusive of study abroad application, pre-departure orientation, credit transfer, and related study abroad processes outlined in the Study Abroad Handbook; courses to be taken during the study abroad semester must have pre-approval of the Graduate School, and grades earned will replace this marker course upon completion of credit transfer back to UND. Repeatable. F,S,SS.

UNIV 994. Professional Internship. 1 Credit.
1 credit, repeatable up to 3. Prerequisite: Graduate standing in major department and consent of the Graduate School. Students are placed in approved sites and are engaged in full-time professional practice to acquire knowledge and skills related to their area of study. Supervision must meet criteria established by the Program and the Graduate School. May be repeated up to three consecutive semesters. Enrolled students are granted full-time equivalent student status by the University. SP/UP grading except for the last semester of enrollment which is S/U grading only. Prerequisite: Graduate students admitted to Clinical Psychology or Counseling Psychology. Repeatable to 3 credits.

University of North Dakota

777
# Index

<table>
<thead>
<tr>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-year B.S.-M.S. Degree Program in Physics</td>
</tr>
<tr>
<td>5-year B.S.-M.S. Degree Program in Physics</td>
</tr>
<tr>
<td>Academic Grievance</td>
</tr>
<tr>
<td>Academic Honors</td>
</tr>
<tr>
<td>Academic Policies and Procedures</td>
</tr>
<tr>
<td>Academic Standards, Probation and Dismissal</td>
</tr>
<tr>
<td>Accelerated and Combined Degree Programs</td>
</tr>
<tr>
<td>Accountancy</td>
</tr>
<tr>
<td>Accountancy</td>
</tr>
<tr>
<td>Accountancy</td>
</tr>
<tr>
<td>Accountancy (Acct)</td>
</tr>
<tr>
<td>Admission of Freshman (Non-Degree and Early Entry)</td>
</tr>
<tr>
<td>Admission of Transfer Students</td>
</tr>
<tr>
<td>Admissions Policies and Procedures</td>
</tr>
<tr>
<td>Admissions Policies and Procedures</td>
</tr>
<tr>
<td>Adult Gerontology Primary Care Nurse Practitioner</td>
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<td>Adult Gerontology Primary Care Nurse Practitioner</td>
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<td>Aerospace Sciences</td>
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<td>Aerospace Sciences</td>
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<tr>
<td>Aerospace Studies</td>
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<tr>
<td>Aerospace Studies (AS)</td>
</tr>
<tr>
<td>Airport Management</td>
</tr>
<tr>
<td>American Indian Studies</td>
</tr>
<tr>
<td>American Indian Studies (IS)</td>
</tr>
<tr>
<td>Anatomy and Cell Biology (Anat)</td>
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<td>Anthropology</td>
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<td>Anthropology (Anth)</td>
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<tr>
<td>Art and Design (Art)</td>
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<td>Art and Design Visual Arts</td>
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<td>Arts and Sciences</td>
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<td>Arts and Sciences</td>
</tr>
<tr>
<td>Arts and Sciences (A &amp; S)</td>
</tr>
<tr>
<td>Assistantships</td>
</tr>
<tr>
<td>Athletic Training</td>
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<tr>
<td>Athletic Training (Sports Medicine)</td>
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<tr>
<td>Atmospheric Sciences</td>
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<tr>
<td>Atmospheric Sciences (AtSc)</td>
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<tr>
<td>Aviation</td>
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<td>Aviation</td>
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<tr>
<td>Aviation (Av)</td>
</tr>
<tr>
<td>Aviation Management</td>
</tr>
</tbody>
</table>

## B

<table>
<thead>
<tr>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.A. with Major in Visual Arts</td>
</tr>
<tr>
<td>B.F.A. with a Major in Graphic Design</td>
</tr>
<tr>
<td>B.F.A. with a Major in Visual Arts</td>
</tr>
<tr>
<td>B.S.P.A. / M.P.A. Combined Degree</td>
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<tr>
<td>B.S.P.A. / M.P.A. Combined Degree</td>
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<tr>
<td>Bachelor of Accountancy</td>
</tr>
<tr>
<td>Bachelor of Administration with Major in Airport Management</td>
</tr>
<tr>
<td>Bachelor of Arts in American Indian Studies</td>
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<tr>
<td>Bachelor of Arts in Anthropology</td>
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<tr>
<td>Bachelor of Arts in Political Science</td>
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<td>Bachelor of Arts with a Major in Chinese Studies</td>
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<td>Bachelor of Arts with a Major in Classical Studies</td>
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<td>Bachelor of Arts with a Major in French</td>
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<td>Bachelor of Arts with a Major in German Studies</td>
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<td>Bachelor of Arts with a Major in Languages</td>
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<td>Bachelor of Arts with a Major in Languages/Teacher Certification</td>
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<tr>
<td>Bachelor of Arts with a Major in Music</td>
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<td>Bachelor of Arts with a Major in Norwegian</td>
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<td>Bachelor of Arts with a Major in Spanish</td>
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<tr>
<td>Bachelor of Arts with Major in Communication</td>
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<tr>
<td>Bachelor of Arts with Major in Communication Sciences and Disorders</td>
</tr>
<tr>
<td>Bachelor of Arts with Major in Computer Science</td>
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<tr>
<td>Bachelor of Arts with Major in English</td>
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<td>Bachelor of Arts with Major in Environmental Studies</td>
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<tr>
<td>Bachelor of Arts with Major in History</td>
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<tr>
<td>Bachelor of Arts with Major in International Studies</td>
</tr>
<tr>
<td>Bachelor of Arts with Major in Philosophy and Religion: Religious Studies Concentration</td>
</tr>
<tr>
<td>Bachelor of Arts with Major in Philosophy and Religious Studies: Philosophy Concentration</td>
</tr>
<tr>
<td>Bachelor of Arts with Major in Philosophy and Religious Studies: Pre-Law Concentration</td>
</tr>
<tr>
<td>Bachelor of Arts with Major in Social Science</td>
</tr>
<tr>
<td>Bachelor of Arts with Major in Sociology</td>
</tr>
</tbody>
</table>
Bachelor of Arts with Major in Theatre Arts ...........................................216
Bachelor of Arts with Major in Visual Arts ........................................... 37
Bachelor of Arts/Bachelor of Science with Major in Psychology .............194
Bachelor of Business Administration with Major in Managerial Finance and Accounting .................................................................106
Bachelor of Business Administration with a Major in Human Resource Management .................................................................150
Bachelor of Business Administration with a Major in Management ...........150
Bachelor of Business Administration with Major in Aviation Management 149
Bachelor of Business Administration with Major in Banking and Financial Economics ................................................................. 85
Bachelor of Business Administration with Major in Business Economics ...85
Bachelor of Business Administration with Major in Entrepreneurship ... 103
Bachelor of Business Administration with Major in Information Systems .. 28
Bachelor of Business Administration with Major in Investments .............105
Bachelor of Business Administration with Major in Managerial Finance and Accounting .................................................................28
Bachelor of Business Administration with Major in Marketing ...............152
Bachelor of Business Administration with Major in Operations and Supply Chain Management ..............................................................149
Bachelor of Economics ........................................................................ 84
Bachelor of Fine Arts in Musical Theatre with Major in Theatre Arts ......216
Bachelor of Fine Arts with Major in Graphic Design ................................37
Bachelor of Fine Arts with Major in Visual Arts ................................... 37
Bachelor of General Studies with a Major in General Studies .................109
Bachelor of General Studies: Women and Gender Studies ...................218
Bachelor of Music with Major in Music Education ................................169
Bachelor of Music with Major in Performance ......................................170
Bachelor of Science in Aeronautics with a Major in Air Traffic Management .............................................................. 47
Bachelor of Science in Aeronautics with a Major in Aviation Studies ......48
Bachelor of Science in Aeronautics with a Major in Commercial Aviation ..48
Bachelor of Science in Aeronautics with a Major in Flight Education ......49
Bachelor of Science in Aeronautics with a Major in Unmanned Aircraft Systems Operations ..............................................................49
Bachelor of Science in Athletic Training ..............................................205
Bachelor of Science in Atmospheric Sciences ..................................... 41
Bachelor of Science in Chemical Engineering ..................................... 62
Bachelor of Science in Chemistry (ACS Certified Program) ..................66
Bachelor of Science in Civil Engineering ............................................ 69
Bachelor of Science in Criminal Justice Studies ................................... 81
Bachelor of Science in Cyber Security ................................................. 91
Bachelor of Science in Data Science ................................................... 77
Bachelor of Science in Dietetics .........................................................179
Bachelor of Science in Earth Science ...................................................118
Bachelor of Science in Education in Secondary Education .................209
Bachelor of Science in Education with Composite Major in Social Studies ........................................................................209
Bachelor of Science in Education with Double Major in Elementary and Middle Level Education .................................................210
Bachelor of Science in Education with Double Major in Elementary Education and Early Childhood .................................................210
Bachelor of Science in Education with Major in Elementary Education ...211
Bachelor of Science in Education with Major in Middle Level Education ..212
Bachelor of Science in Education with Major in Science .....................212
Bachelor of Science in Electrical Engineering ..................................... 91
Bachelor of Science in Electrical Engineering with Aerospace Focus ..... 92
Bachelor of Science in Electrical Engineering with Biomedical Engineering Focus .............................................................. 93
Bachelor of Science in Electrical Engineering with Computer Science Focus .............................................................. 95
Bachelor of Science in Environmental Geoscience ................................118
Bachelor of Science in Geological Engineering ...................................119
Bachelor of Science in Geology ............................................................ 120
Bachelor of Science in Human Nutrition ..........................................178
Bachelor of Science in Industrial Technology ...................................... 104
Bachelor of Science in Kinesiology .....................................................133
Bachelor of Science in Mechanical Engineering ..................................158
Bachelor of Science in Medical Laboratory Science .........................161
Bachelor of Science in Nursing On-Campus Program .........................174
Bachelor of Science in Nursing Online Program ...............................176
Bachelor of Science in Petroleum Engineering ....................................182
Bachelor of Science in Public Health Education (B.S.P.H.E.) .............135
Bachelor of Science in Rehabilitation and Human Services .................197
Bachelor of Science in Rehabilitation and Human Services/Master of Arts in Counseling ......................................................373
Bachelor of Science in Rehabilitation and Human Services/Master of Arts in Counseling ......................................................373
Bachelor of Science in Social Work ...................................................199
Bachelor of Science in Social Work Second Degree Program ..............200
Bachelor of Science with a Major in Geography ................................112
Bachelor of Science with a Major in Computer Science ..................... 78
Bachelor of Science with Major in Biology ......................................... 53
Bachelor of Science with Major in Biology (Professional Health Sciences Emphasis) .............................................................. 55
Bachelor of Science with Major in Chemistry ..................................... 66
Bachelor of Science with Major in Environmental Studies .................112
Bachelor of Science with Major in Fisheries and Wildlife Biology .......... 57
Bachelor of Science with Major in Forensic Science .........................108
Bachelor of Science with Major in Mathematics ........................................ 155
Bachelor of Science with Major in Molecular and Integrative Biology ........ 57
Bachelor of Science with Major in Physics ............................................ 159
Bachelor of Science with Major in Public Affairs .................................... 196
Bachelor of Science/Master of Science Combined Degree in Chemistry . 357
Bachelor of Science/Master of Science Combined Degree in Chemistry . 357
Banking & Financial Economics ....................................................... 271
Banking and Financial Economics .................................................... 50
Biochemistry and Molecular Biology (BMB) ......................................... 51
Biology ............................................................................................... 222
Biology ............................................................................................... 339
Biology ............................................................................................... 339
Biology (Biol) ..................................................................................... 51
Biomedical Engineering ......................................................................... 433
Biomedical Engineering ......................................................................... 433
Biomedical Science (BIMD) ................................................................... 59
Biomedical Sciences .............................................................................. 343
Biomedical Sciences .............................................................................. 343
Business Administration ......................................................................... 348
Business Administration ......................................................................... 348
Business Administration (BAdm) ........................................................... 59
Business Economics ................................................................................. 272

C
Categories of Admission ........................................................................ 307
Certificate in Applied Economics ........................................................... 86
Certificate in Behavioral Health ............................................................. 195
Certificate in Chinese ........................................................................... 143
Certificate in Classical Studies .............................................................. 143
Certificate in Cyberpsychology .............................................................. 195
Certificate in Diversity and Inclusion ..................................................... 39
Certificate in Environmental Engineering ............................................. 450
Certificate in Environmental Engineering ............................................. 450
Certificate in Forensic Psychology ....................................................... 195
Certificate in French ............................................................................. 143
Certificate in German ........................................................................... 143
Certificate in Health Administration .................................................... 534
Certificate in Health Administration .................................................... 534
Certificate in Learning Analytics ......................................................... 386
Certificate in Learning Analytics ......................................................... 386
Certificate in Medical Laboratory Science Program (4+1 Track) ....... 162
Certificate in Nonprofit Leadership ...................................................... 171
Certificate in Norwegian ..................................................................... 144
Certificate in Petroleum Engineering .................................................. 182
Certificate in Policy Analysis ............................................................... 534
Certificate in Policy Analysis ............................................................... 534
Certificate in Public Administration ..................................................... 534
Certificate in Public Administration ..................................................... 534
Certificate in Quantitative Research Methods ...................................... 386
Certificate in Quantitative Research Methods ...................................... 386
Certificate in Social Entrepreneurship ................................................ 535
Certificate in Social Entrepreneurship ................................................ 535
Certificate in Spanish ........................................................................... 144
Certificate in Writing and Editing ......................................................... 99
Challenge Examinations ....................................................................... 310
Chemical Engineering .......................................................................... 287
Chemical Engineering .......................................................................... 435
Chemical Engineering .......................................................................... 435
Chemical Engineering (ChE) ................................................................. 61
Chemistry ............................................................................................. 227
Chemistry ............................................................................................. 356
Chemistry ............................................................................................. 356
Chemistry (Chem) ................................................................................ 64
Civil Engineering .................................................................................. 287
Civil Engineering .................................................................................. 437
Civil Engineering .................................................................................. 437
Civil Engineering (CE) .......................................................................... 68
Clinical Translational Science ............................................................... 359
Clinical Translational Science ............................................................... 359
Cognate/Minor in Space Studies ............................................................ 549
Cognate/Minor in Space Studies ............................................................ 549
College of Arts and Sciences ................................................................. 220
College of Business and Public Administration .................................... 269
College of Education & Human Development ..................................... 280
College of Engineering & Mines ........................................................... 287
College of Nursing and Professional Disciplines .................................. 294
Combined B.S./M.S. or B.S./M.Eng. Degrees in Electrical Engineering .. 4.46
Combined B.S./M.S. or B.S./M.Eng. Degrees in Electrical Engineering .. 4.46
Combined Degree in Civil Engineering ................................................ 438
Combined Degree in Civil Engineering ................................................ 438
Combined Master of Public Administration/Juris Doctor Degree .......... 535
Combined Master of Public Administration/Juris Doctor Degree .......... 535
Combined Program in Counseling with a Rehabilitation Emphasis ....... 79
Common Course Numbers ................................................................... 310
Communication .................................................................................... 229
<table>
<thead>
<tr>
<th>Course</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication</td>
<td>361</td>
</tr>
<tr>
<td>Communication</td>
<td>361</td>
</tr>
<tr>
<td>Communication Program (Comm)</td>
<td>70</td>
</tr>
<tr>
<td>Communication Sciences and Disorders</td>
<td>229</td>
</tr>
<tr>
<td>Communication Sciences and Disorders</td>
<td>364</td>
</tr>
<tr>
<td>Communication Sciences and Disorders</td>
<td>364</td>
</tr>
<tr>
<td>Communication Sciences and Disorders</td>
<td>72</td>
</tr>
<tr>
<td>Computer Science</td>
<td>230</td>
</tr>
<tr>
<td>Computer Science</td>
<td>365</td>
</tr>
<tr>
<td>Computer Science</td>
<td>365</td>
</tr>
<tr>
<td>Conduct in General</td>
<td>24</td>
</tr>
<tr>
<td>Continuing Enrollment - 996</td>
<td>311</td>
</tr>
<tr>
<td>Cooperative Education</td>
<td>20</td>
</tr>
<tr>
<td>Correspondence and Online Studies</td>
<td>311</td>
</tr>
<tr>
<td>Counseling Psychology and Community Services</td>
<td>370</td>
</tr>
<tr>
<td>Counseling Psychology and Community Services</td>
<td>370</td>
</tr>
<tr>
<td>Counseling Psychology and Community Services (Coun)</td>
<td>79</td>
</tr>
<tr>
<td>Criminal Justice</td>
<td>377</td>
</tr>
<tr>
<td>Criminal Justice Studies</td>
<td>230</td>
</tr>
<tr>
<td>Criminal Justice Studies (CJ)</td>
<td>80</td>
</tr>
<tr>
<td>Curriculum and Instruction</td>
<td>397</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Degrees and Degree Requirements</td>
<td>319</td>
</tr>
<tr>
<td>Degrees Granted</td>
<td>18</td>
</tr>
<tr>
<td>Departmental Courses, Programs</td>
<td>323</td>
</tr>
<tr>
<td>Departmental Courses, Programs</td>
<td>323</td>
</tr>
<tr>
<td>Doctor of Arts in History</td>
<td>465</td>
</tr>
<tr>
<td>Doctor of Arts in History</td>
<td>465</td>
</tr>
<tr>
<td>Doctor of Education in Educational Leadership</td>
<td>389</td>
</tr>
<tr>
<td>Doctor of Education in Educational Leadership</td>
<td>389</td>
</tr>
<tr>
<td>Doctor of Education in Educational Practice and Leadership</td>
<td>395</td>
</tr>
<tr>
<td>Doctor of Education in Educational Practice and Leadership</td>
<td>395</td>
</tr>
<tr>
<td>Doctor of Education in Higher Education</td>
<td>414</td>
</tr>
<tr>
<td>Doctor of Education in Higher Education</td>
<td>414</td>
</tr>
<tr>
<td>Doctor of Occupational Therapy</td>
<td>513</td>
</tr>
<tr>
<td>Doctor of Occupational Therapy</td>
<td>513</td>
</tr>
<tr>
<td>Doctor of Philosophy in Aerospace Sciences</td>
<td>338</td>
</tr>
<tr>
<td>Doctor of Philosophy in Atmospheric Sciences</td>
<td>332</td>
</tr>
<tr>
<td>Doctor of Philosophy in Atmospheric Sciences</td>
<td>332</td>
</tr>
<tr>
<td>Doctor of Philosophy in Biology</td>
<td>342</td>
</tr>
<tr>
<td>Doctor of Philosophy in Biomedical Engineering</td>
<td>342</td>
</tr>
<tr>
<td>Doctor of Philosophy in Biomedical Engineering</td>
<td>433</td>
</tr>
<tr>
<td>Doctor of Philosophy in Biomedical Sciences</td>
<td>433</td>
</tr>
<tr>
<td>Doctor of Philosophy in Biomedical Sciences</td>
<td>346</td>
</tr>
<tr>
<td>Doctor of Philosophy in Chemical Engineering</td>
<td>346</td>
</tr>
<tr>
<td>Doctor of Philosophy in Chemical Engineering</td>
<td>436</td>
</tr>
<tr>
<td>Doctor of Philosophy in Chemistry</td>
<td>358</td>
</tr>
<tr>
<td>Doctor of Philosophy in Chemistry</td>
<td>358</td>
</tr>
<tr>
<td>Doctor of Philosophy in Civil Engineering</td>
<td>438</td>
</tr>
<tr>
<td>Doctor of Philosophy in Civil Engineering</td>
<td>438</td>
</tr>
<tr>
<td>Doctor of Philosophy in Clinical Psychology</td>
<td>528</td>
</tr>
<tr>
<td>Doctor of Philosophy in Clinical Psychology</td>
<td>528</td>
</tr>
<tr>
<td>Doctor of Philosophy in Clinical Translational Science</td>
<td>360</td>
</tr>
<tr>
<td>Doctor of Philosophy in Clinical Translational Science</td>
<td>360</td>
</tr>
<tr>
<td>Doctor of Philosophy in Communication</td>
<td>362</td>
</tr>
<tr>
<td>Doctor of Philosophy in Communication</td>
<td>362</td>
</tr>
<tr>
<td>Doctor of Philosophy in Counseling Psychology</td>
<td>373</td>
</tr>
<tr>
<td>Doctor of Philosophy in Counseling Psychology</td>
<td>373</td>
</tr>
<tr>
<td>Doctor of Philosophy in Criminal Justice Studies</td>
<td>378</td>
</tr>
<tr>
<td>Doctor of Philosophy in Criminal Justice Studies</td>
<td>378</td>
</tr>
<tr>
<td>Doctor of Philosophy in Earth System Science and Policy</td>
<td>380</td>
</tr>
<tr>
<td>Doctor of Philosophy in Earth System Science and Policy</td>
<td>380</td>
</tr>
<tr>
<td>Doctor of Philosophy in Educational Foundations and Research</td>
<td>386</td>
</tr>
<tr>
<td>Doctor of Philosophy in Educational Foundations and Research</td>
<td>386</td>
</tr>
<tr>
<td>Doctor of Philosophy in Educational Leadership</td>
<td>390</td>
</tr>
<tr>
<td>Doctor of Philosophy in Educational Leadership</td>
<td>390</td>
</tr>
<tr>
<td>Doctor of Philosophy in Educational Leadership</td>
<td>446</td>
</tr>
<tr>
<td>Doctor of Philosophy in Electrical Engineering</td>
<td>446</td>
</tr>
<tr>
<td>Doctor of Philosophy in Electrical Engineering</td>
<td>446</td>
</tr>
<tr>
<td>Doctor of Philosophy in Energy Engineering</td>
<td>449</td>
</tr>
<tr>
<td>Doctor of Philosophy in Energy Engineering</td>
<td>449</td>
</tr>
<tr>
<td>Doctor of Philosophy in English</td>
<td>457</td>
</tr>
<tr>
<td>Doctor of Philosophy in English</td>
<td>457</td>
</tr>
<tr>
<td>Doctor of Philosophy in Environmental Engineering</td>
<td>451</td>
</tr>
<tr>
<td>Doctor of Philosophy in Environmental Engineering</td>
<td>451</td>
</tr>
<tr>
<td>Doctor of Philosophy in General/Experimental Psychology</td>
<td>529</td>
</tr>
<tr>
<td>Doctor of Philosophy in General/Experimental Psychology</td>
<td>529</td>
</tr>
<tr>
<td>Doctor of Philosophy in Geology</td>
<td>462</td>
</tr>
<tr>
<td>Doctor of Philosophy in Geology</td>
<td>462</td>
</tr>
<tr>
<td>Doctor of Philosophy in Higher Education</td>
<td>414</td>
</tr>
<tr>
<td>Doctor of Philosophy in Higher Education</td>
<td>414</td>
</tr>
<tr>
<td>Doctor of Philosophy in History Combined Program with NDSU</td>
<td>466</td>
</tr>
</tbody>
</table>
Doctor of Philosophy in History Combined Program with NDSU .................................................................. 466
Doctor of Philosophy in Mechanical Engineering ......................................................................................... 453
Doctor of Philosophy in Mechanical Engineering ......................................................................................... 453
Doctor of Philosophy in Physics and Astrophysics ......................................................................................... 526
Doctor of Philosophy in Physics and Astrophysics ......................................................................................... 526
Doctor of Philosophy in Scientific Computing ................................................................................................. 367
Doctor of Philosophy in Scientific Computing ................................................................................................. 367
Doctor of Philosophy in Teaching and Learning .............................................................................................. 397
Doctor of Philosophy in Teaching and Learning .............................................................................................. 397
Doctor of Philosophy in Music Education ......................................................................................................... 477
Doctor of Philosophy in Music Education ......................................................................................................... 477
Doctor of Physical Therapy ............................................................................................................................... 520
Doctor of Physical Therapy ............................................................................................................................... 520
Energy Systems Engineering ............................................................................................................................ 449
Engineering ..................................................................................................................................................... 432
Engineering ..................................................................................................................................................... 432
Engineering (Engr) .......................................................................................................................................... 96
English ............................................................................................................................................................... 232
English Language and Literature ..................................................................................................................... 456
English Language and Literature ..................................................................................................................... 456
English Language and Literature (Engl) ......................................................................................................... 97
English Language Learner or Bilingual Education Endorsement ................................................................. 213
English Language Learners (TESOL) ............................................................................................................. 409
English Language Learners (TESOL) ............................................................................................................. 409
Enrolling in More than One Program .............................................................................................................. 311
Entrepreneurship ............................................................................................................................................. 273
Entrepreneurship (ENTR), School of ............................................................................................................... 100
Environmental Engineering ............................................................................................................................. 450
Environmental Engineering ............................................................................................................................. 450
Environmental Studies ................................................................................................................................... 233
Environmental Studies (Geog) ......................................................................................................................... 109

E
Early Childhood Education ............................................................................................................................... 280
Early Childhood Education ............................................................................................................................... 401
Early Childhood Education ............................................................................................................................... 401
Earth System Science and Policy ..................................................................................................................... 378
Earth System Science and Policy ..................................................................................................................... 378
Earth System Science and Policy (ESSP) ......................................................................................................... 81
Economics ......................................................................................................................................................... 231
Economics ......................................................................................................................................................... 272
Economics (Applied) ........................................................................................................................................ 382
Economics (Applied) ........................................................................................................................................ 382
Economics (Econ) ............................................................................................................................................... 82
Education ......................................................................................................................................................... 384
Education ......................................................................................................................................................... 384
Education and Human Development (EHD) ..................................................................................................... 87
Educational Foundations and Research ............................................................................................................ 384
Educational Foundations and Research ............................................................................................................ 384
Educational Leadership ........................................................................................................................................ 388
Educational Leadership ........................................................................................................................................ 388
Educational Leadership (EDL) .......................................................................................................................... 87
Electrical Engineering ...................................................................................................................................... 288
Electrical Engineering and Computer Science, School of ............................................................................... 441
Electrical Engineering and Computer Science, School of ............................................................................... 441
Elementary Education ....................................................................................................................................... 281
Elementary Education ....................................................................................................................................... 405
Elementary Education ....................................................................................................................................... 405
Eligibility for Faculty to Pursue Graduate Degree ............................................................................................. 308
Eligibility to Work for an Advanced Degree ..................................................................................................... 308
Energy Systems Engineering ............................................................................................................................. 449
Faculty Appointments ........................................................................................................................................ 311
Family Nurse Practitioner ................................................................................................................................. 498
Family Nurse Practitioner ................................................................................................................................. 498
Final Examination Policy ................................................................................................................................... 23
Finance (Fin) .................................................................................................................................................... 104
Fine Arts (FA) .................................................................................................................................................. 106
Five-Year Bachelor of Science-Master of Science Degree Program in Physics ................................................ 189
Forensic Science ............................................................................................................................................... 106
Forensic Science ............................................................................................................................................... 234
Four Year Plans ............................................................................................................................................... 220

G
General Studies ............................................................................................................................................... 109
Geography ......................................................................................................................................................... 235
Geography and Geographic Information Science ............................................................................................ 458
Geography and Geographic Information Science ............................................................................................ 458
Geography and Geographic Information Science (Geog) ............................................................................. 109
Geology ............................................................................................................................................................. 292
Geology and Geological Engineering ............................................................................................................... 461
Geology and Geological Engineering ............................................................................................................... 461
Grades ............................................................................................................................................................... 313
Graduate Academic Information ...................................................................................................................... 305
Graduate Certificate in Behavioral Data Analytics ............................................................................................ 529
Graduate Certificate in Behavioral Data Analytics ........................................... 529
Graduate Certificate in Community-Based Literacy as Applied Linguistics ........ 470
Graduate Certificate in Cyber Security and Behavior ....................................... 529
Graduate Certificate in Public Health .............................................................. 539
Graduate Certificate in Unmanned Aircraft Systems Engineering ...................... 454
Graduate Certificate in Unmanned Aircraft Systems Engineering ...................... 454
Graduate Cooperative Education ...................................................................... 313
Graduate Credit ................................................................................................. 314
Graduate Minor in Psychology .......................................................................... 529
Graduate Minor in Psychology .......................................................................... 529
Graduate Minor in Statistics ............................................................................ 473
Graduate Minor in Statistics ............................................................................ 473
Graduation-Application for Degree or Diploma ................................................. 314
Graphic Design and New Art Media ................................................................. 238
Graphic Design Technology ............................................................................. 273

H
Harold Hamm School of Geology and Geological Engineering (Geol and GeoE) ........................................ 114
Higher Education ............................................................................................ 412
Higher Education ............................................................................................ 412
History ............................................................................................................. 238
History ............................................................................................................. 464
History (Hist) .................................................................................................. 464
Histotechnician Certificate .............................................................................. 125
Histotechnician Program .................................................................................. 124
Honors ............................................................................................................. 126
Honors Program (Hon) .................................................................................... 125
Human Resource Management ....................................................................... 274
Humanities (Hum) ............................................................................................ 126

I
Industrial Technology ....................................................................................... 275
Information Systems .......................................................................................... 275
Instructional Design and Technology ................................................................ 416
Instructional Design and Technology ................................................................ 416
Instructional Design and Technology Graduate Certificates ............................ 417
Instructional Design and Technology Graduate Certificates ............................ 417

Instrumental Performance ................................................................................ 240
Interdisciplinary Health Studies (IDS) ............................................................... 127
International Studies ......................................................................................... 242
International Studies (A&S) ............................................................................. 127
Investments ....................................................................................................... 276

J
John D. Odegard School of Aerospace Sciences .............................................. 297
Joint M.D./Ph.D. in Biomedical Sciences ......................................................... 346

K
Kindergarten Endorsement ............................................................................. 213
Kinesiology ....................................................................................................... 282
Kinesiology and Public Health Education ....................................................... 467
Kinesiology and Public Health Education ....................................................... 467
Kinesiology and Public Health Education (KPHE) .......................................... 128

L
Languages ....................................................................................................... 243
Languages: Department of Modern and Classical Languages & Literatures (Lang) .................................................................................. 136
Leadership Minor .............................................................................................. 145
Leadership Minor (Lead) ................................................................................ 145
Leave of Absence from Graduate Study ......................................................... 314
Linguistics ........................................................................................................ 469
Linguistics ........................................................................................................ 469
Linguistics (Ling) ............................................................................................ 146

M
Major Declaration Policy, Common Course Numbers, Special Exams ................. 19
Management ..................................................................................................... 276
Management (Mgmt) ...................................................................................... 147
Managerial Finance & Accounting .................................................................. 277
Marketing ........................................................................................................ 278
Marketing (MRKT) ........................................................................................... 151
Master of Accountancy .................................................................................... 326
Master of Accountancy .................................................................................... 326
Master of Arts in Communication .................................................................... 363
Master of Arts in Communication .................................................................... 363
Master of Arts in Counseling Psychology and Community Services .............. 375
Master of Arts in Counseling Psychology and Community Services .............. 375
Master of Arts in English ............................................................................... 458
Master of Arts in English ............................................................................... 458
Master of Arts in Forensic Psychology ............................................................. 530
Master of Arts in Forensic Psychology ............................................................. 530
Master of Arts in Geography .......................................................................... 460
| Master of Arts in Geography                                   | 460 |
| Master of Arts in Geology                                    | 463 |
| Master of Arts in Geology                                    | 463 |
| Master of Arts in History                                    | 467 |
| Master of Arts in History                                    | 467 |
| Master of Arts in Linguistics                                | 471 |
| Master of Arts in Linguistics                                | 471 |
| Master of Arts in Psychology                                 | 530 |
| Master of Arts in Psychology                                 | 530 |
| Master of Arts in Sociology                                  | 543 |
| Master of Arts in Sociology                                  | 544 |
| Master of Business Administration                           | 354 |
| Master of Business Administration                           | 354 |
| Master of Business Administration/Juris Doctor Combined Program | 355 |
| Master of Education in Educational Leadership                | 391 |
| Master of Education in Educational Leadership                | 391 |
| Master of Education in Elementary Education                  | 408 |
| Master of Education in Elementary Education                  | 408 |
| Master of Education in ELL Education                        | 412 |
| Master of Education in ELL Education                        | 412 |
| Master of Education in Instructional Design and Technology   | 417 |
| Master of Education in Instructional Design and Technology   | 417 |
| Master of Education in Mathematics                           | 473 |
| Master of Education in Mathematics                           | 473 |
| Master of Education in Reading Education                     | 422 |
| Master of Education in Reading Education                     | 422 |
| Master of Education in Special Education                     | 426 |
| Master of Education in Special Education                     | 426 |
| Master of Engineering in Chemical Engineering                | 436 |
| Master of Engineering in Chemical Engineering                | 436 |
| Master of Engineering in Civil Engineering                   | 440 |
| Master of Engineering in Civil Engineering                   | 440 |
| Master of Engineering in Civil Engineering                   | 440 |
| Master of Engineering in Energy Systems Engineering           | 450 |
| Master of Engineering in Energy Systems Engineering           | 450 |
| Master of Engineering in Environmental Engineering            | 451 |
| Master of Engineering in Environmental Engineering            | 451 |
| Master of Engineering in Mechanical Engineering               | 455 |
| Master of Engineering in Mechanical Engineering               | 455 |
| Master of Engineering in Unmanned Aircraft Systems Engineering | 455 |
| Master of Engineering in Unmanned Aircraft Systems Engineering | 455 |
| Master of Environmental Management                           | 380 |
| Master of Environmental Management                           | 380 |
| Master of Fine Arts                                          | 329 |
| Master of Fine Arts                                          | 329 |
| Master of Music                                              | 478 |
| Master of Music                                              | 478 |
| Master of Occupational Therapy                              | 515 |
| Master of Occupational Therapy                              | 515 |
| Master of Physician Assistant Studies                        | 523 |
| Master of Physician Assistant Studies                        | 523 |
| Master of Public Administration                              | 535 |
| Master of Public Administration                              | 535 |
| Master of Public Health                                       | 539 |
| Master of Public Health                                       | 539 |
| Master of Science in Adult Gerontology Primary Care Nurse Practitioner | 509 |
| Master of Science in Adult Gerontology Primary Care Nurse Practitioner | 509 |
| Master of Science in Applied Economics                       | 383 |
| Master of Science in Applied Economics                       | 383 |
| Master of Science in Atmospheric Sciences                    | 332 |
| Master of Science in Atmospheric Sciences                    | 332 |
| Master of Science in Aviation                                | 337 |
| Master of Science in Aviation                                | 337 |
| Master of Science in Biology                                 | 342 |
| Master of Science in Biology                                 | 342 |
| Master of Science in Biomedical Engineering                  | 434 |
| Master of Science in Biomedical Engineering                  | 434 |
| Master of Science in Biomedical Sciences                     | 347 |
| Master of Science in Biomedical Sciences                     | 347 |
| Master of Science in Clinical Translational Science          | 361 |
| Master of Science in Clinical Translational Science          | 361 |
| Master of Science in Communication Sciences and Disorders     | 365 |
| Master of Science in Communication Sciences and Disorders     | 365 |
| Master of Science in Computer Science                        | 369 |
Master of Science in Computer Science ........................................ 369
Master of Science in Curriculum and Instruction .............................. 400
Master of Science in Curriculum and Instruction .............................. 400
Master of Science in Cyber Security ............................................ 447
Master of Science in Cyber Security ............................................ 447
Master of Science in Data Science .............................................. 370
Master of Science in Data Science .............................................. 370
Master of Science in Early Childhood Education .............................. 404
Master of Science in Early Childhood Education .............................. 404
Master of Science in Earth System Science and Policy ....................... 381
Master of Science in Earth System Science and Policy ....................... 381
Master of Science in Educational Leadership ................................ 392
Master of Science in Educational Leadership ................................ 392
Master of Science in Educational Studies ..................................... 387
Master of Science in Educational Studies ..................................... 387
Master of Science in Electrical Engineering .................................. 449
Master of Science in Electrical Engineering .................................. 449
Master of Science in Elementary Education .................................. 408
Master of Science in Elementary Education .................................. 408
Master of Science in Energy Systems Engineering ........................... 450
Master of Science in Energy Systems Engineering ........................... 450
Master of Science in Environmental Engineering ............................ 451
Master of Science in Environmental Engineering ............................ 451
Master of Science in Family Nurse Practitioner .............................. 503
Master of Science in Family Nurse Practitioner .............................. 503
Master of Science in Forensic Psychology .................................... 531
Master of Science in Forensic Psychology .................................... 531
Master of Science in Geography ................................................ 460
Master of Science in Geography ................................................ 460
Master of Science in Geology .................................................... 463
Master of Science in Geology .................................................... 463
Master of Science in Higher Education ....................................... 415
Master of Science in Higher Education ....................................... 415
Master of Science in Instructional Design and Technology ................ 418
Master of Science in Instructional Design and Technology ................ 418
Master of Science in Kinesiology .............................................. 468
Master of Science in Kinesiology .............................................. 468
Master of Science in Mechanical Engineering ............................... 455
Master of Science in Mechanical Engineering ............................... 455
Master of Science in Medical Laboratory Science ............................ 475
Master of Science in Medical Laboratory Science ............................ 475
Master of Science in Nurse Anesthesia ....................................... 491
Master of Science in Nurse Anesthesia ....................................... 491
Master of Science in Nurse Educator ......................................... 491
Master of Science in Nurse Educator ......................................... 491
Master of Science in Nutrition .................................................. 510
Master of Science in Nutrition .................................................. 510
Master of Science in Physics and Astrophysics ............................... 526
Master of Science in Physics and Astrophysics ............................... 526
Master of Science in Psychiatric Mental Health Nurse Practitioner ...... 497
Master of Science in Psychiatric Mental Health Nurse Practitioner ...... 497
Master of Science in Reading Education ....................................... 422
Master of Science in Reading Education ....................................... 422
Master of Science in Space Studies ............................................ 549
Master of Science in Space Studies ............................................ 549
Master of Science in Special Education ....................................... 429
Master of Science in Special Education ....................................... 429
Master of Science in Unmanned Aircraft Systems Engineering ............ 456
Master of Science in Unmanned Aircraft Systems Engineering ............ 456
Master of Science with Major in Mathematics ............................... 473
Master of Science with Major in Mathematics ............................... 473
Master of Social Work ............................................................ 542
Master of Social Work ............................................................ 542
Mathematics ................................................................. 246
Mathematics ................................................................. 246
Mathematics ........................................................................... 471
Mathematics ........................................................................... 471
Mathematics (Math) ................................................................. 153
Matriculation ............................................................................ 308
Matriculation ............................................................................ 308
Maximum and Minimum Academic Load ...................................... 314
Maximum and Minimum Academic Load ...................................... 314
Maximum Period Allowed and Revalidation of Courses .................... 314
Maximum Period Allowed and Revalidation of Courses .................... 314
Mechanical Engineering ............................................................ 292
Mechanical Engineering ............................................................ 292
Mechanical Engineering ............................................................ 452
Mechanical Engineering ............................................................ 452
Mechanical Engineering (ME) ...................................................... 156
Mechanical Engineering (ME) ...................................................... 156
Medical Laboratory Science ...................................................... 303
Medical Laboratory Science ...................................................... 303
Medical Laboratory Science ...................................................... 474
Medical Laboratory Science ...................................................... 474
Medical Laboratory Science (MLS) .............................................. 159
Medical Laboratory Science (MLS) .............................................. 159
Medicine (Med) ........................................................................ 163
Medicine (Med) ........................................................................ 163
Microbiology and Immunology (MBio) .......................................... 163
Microbiology and Immunology (MBio) .......................................... 163
Middle Level Education ............................................................... 284
Middle Level Education ............................................................... 284
Military Science (MS) ................................................................ 163
Military Science (MS) ................................................................ 163
Minimum General School of Graduate Studies Admission Requirements 306
Minimum General School of Graduate Studies Admission Requirements 306
Minor in American Indian Studies .................................................. 32
Minor in American Indian Studies .................................................. 32
Minor in Anthropology .............................................. 34
Minor in Art History and Museum Studies ...................... 38
Minor in Astrophysics ............................................. 190
Minor in Athletic Coaching ..................................... 135
Minor in Atmospheric Sciences ................................ 42
Minor in Aviation - Professional Flight ........................ 95
Minor in Aviation Management .................................. 50
Minor in Biology .................................................... 59
Minor in Biomedical Engineering ............................... 96
Minor in Canadian Area Studies ................................ 40
Minor in Chemical Dependency ................................. 200
Minor in Chemistry ................................................ 68
Minor in Chinese Studies: Culture and Business ............. 60
Minor in Chinese Studies: Language and Culture ............ 144
Minor in Classical Studies ....................................... 144
Minor in Communication ......................................... 72
Minor in Computer Science ....................................... 78
Minor in Counseling Psychology and Community Services . 377
Minor in Criminal Justice Studies ............................... 81
Minor in Cyber Security ......................................... 78
Minor in Dance ..................................................... 217
Minor in Early Childhood Education ........................... 213
Minor in Economics ................................................ 86
Minor in Electrical Engineering ................................ 96
Minor in Engineering Science ................................... 97
Minor in English .................................................... 100
Minor in Ethics ..................................................... 186
Minor in French ..................................................... 144
Minor in Geography ............................................... 113
Minor in Geology .................................................. 121
Minor in Geospatial Technologies .............................. 113
Minor in German ................................................... 145
Minor in Gerontology ............................................. 200
Minor in Graphic Design ......................................... 38
Minor in Graphic Design Technology .......................... 104
Minor in History .................................................... 124
Minor in Information Systems ................................... 28
Minor in International Business (for Business majors only) 60
Minor in International Studies .................................. 128
Minor in Linguistics ................................................. 146
Minor in Literacy Education ..................................... 213

Minor in Mathematics ............................................. 155
Minor in Mathematics for Elementary Education ............. 156
Minor in Middle Level Education ............................... 214
Minor in Military Science ....................................... 164
Minor in Music ....................................................... 170
Minor in Music ....................................................... 171
Minor in Nonprofit Leadership .................................. 171
Minor in Norwegian .............................................. 145
Minor in Nutrition .................................................. 179
Minor in Operations and Supply Chain Management ....... 151
Minor in Philosophy and Religion: Religious Studies Concentration ........ 186
Minor in Philosophy and Religious Studies: Philosophy Concentration 186
Minor in Physics ..................................................... 190
Minor in Political Science ........................................ 192
Minor in Professional Flight ..................................... 50
Minor in Psychology ................................................ 195
Minor in Public Administration .................................. 197
Minor in Public Health ............................................ 135
Minor in Rehabilitation and Human Services ................. 198
Minor in Sociology ................................................ 202
Minor in Space Studies ........................................... 203
Minor in Space Studies ........................................... 204
Minor in Spanish .................................................... 145
Minor in Special Education ...................................... 214
Minor in Sport Business .......................................... 60
Minor in Statistics .................................................. 156
Minor in Sustainability Studies ................................ 82
Minor in Theatre Arts .............................................. 217
Minor in Unmanned Aircraft Systems ......................... 50
Minor in Visual Arts (Studio) .................................... 38
Minor in Women & Gender Studies ............................. 219
Minors and Cognates .............................................. 315
Music ................................................................. 248
Music ................................................................. 475
Music ................................................................. 475
Music Education ................................................... 252
Music (Musc) ......................................................... 165
Musical Theatre ..................................................... 255

N

New Undergraduate Student Information ......................... 14
Nonprofit Leadership Program (NLP) .......................... 171
Note to International Students .................................. 308